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THE RECRUITING OF SANITARIANS FOR THE FUTURE SERVICE OF THE STATE*

C.-E. A. WINSLOW, D.P.H., FELLOW A. P. H. A.
Professor of Public Health, Yale School of Medicine

AS citizens of the United States we are pledged to the splendid experiment of democratic government; but as thoughtful men and students of history we must remember that it is still an experiment. In the long vista of human evolution the century and a half for which such government has been attempted is too short a period to yield conclusive results. We believe in democracy as a working hypothesis but we must also believe in the need for leadership. Men and women may be born free and equal in respect to certain essential rights and privileges and opportunities, but they are not equal in strength of muscle or of intellect or of character.

Democracy will remain on trial and its success will be still uncertain until we know to what extent it shall prove possible through this system to secure a right leadership and the popular intelligence to accept such leadership when it is offered.

In that particular realm of social action we are discussing this morning, in the field of public health, it is abundantly clear that the essential problem is the problem of personnel. We can give our health departments the powers which they need, we can furnish them with the funds which they require, but we shall never secure a maximum of results unless the whole campaign is directed with expert knowledge, with integrity and with enthusiasm. If the health officer possesses these qualities he will succeed and his success will be fraught with rich blessings for the community under his charge. If he is an untrained man, or a mediocre man, we shall always fall short of those achievements which modern science has placed within our grasp. The recruitment of leaders, of sound training and high natural capacity, is the crux of the public health movement of the present day and the discussion of this problem, which has been stimulated during the past year by General Cumming and his associates of the Public Health Service, is fraught with the deepest importance for the future of the movement which we have at heart.

In considering almost any phase of public health one can go back for one's text to that remarkable volume on English Sanitary Institutions by Sir John

*Read before Conference on Education of Sanitarians held jointly by the Surgeon-General, U. S. Public Health Service, and the Council on Health and Public Instruction of the American Medical Association, Chicago, March 7, 1923.

Simon. For our present purposes we may note that in discussing the report of the Royal Sanitary Commission of 1869-71, he says: "Of all the questions in modern State Medicine, perhaps none is more deeply important than that of the system on which Members of the Medical Profession should be made servicable in the administration of the Health laws." He goes on to point out that "an 'Officer of Health' was understood to have two distinguishing marks; first, as to qualification, that he was an Expert and (as compared with co-existing forms of medical practitioner) in some degree a Specialist, in regard of knowledge and skill applicable to the Prevention of Disease; and secondly, as to duty, that he had undertaken to act as impartial Public Accuser and Adviser against whatsoever unwholesome influences in his district should be removable under the sanitary law. On that view of the meaning of the term, clearly an Officership of Health was not a post which every medical practitioner of 1871 could be deemed qualified to hold, nor a post which could be held in easy compatibility with every other sort of professional engagement. The Officership of Health, in certain chief parts of its working, was an officer for the redress of wrongs. Though not of judicial authority, it was of essential bearing on the administration of justice within its particular province of affairs; its standards of duty must be such standards of diligence and impartiality as the administration of justice universally requires; the office could not fitly be held by any man who would not work it in that spirit, or would flinch from accusing where he ought to accuse. . . . It would of course be unfit that the Officer should be collaterally engaged in any commerce which might probably render his official judgment less single-sighted, or his official activity less straightforward, than it ought to be; and presumably the duties of the office would not in general easily harmonize with the interests of a practitioner who should be having to earn the main part of his livelihood by ordinary private practice within the same area. It would also seem clear that Officerships of Health could hardly answer to the pretensions of their name nor be of much real account in the service of the public, except in proportion as they were important items in the lives of those who held them; not in each case on so petty a scale as to involve mere driblets of occasional duty, but, on the contrary, on such a scale that each appointment, in regard of its work and remuneration, might satisfy, wholly or in considerable part, the claims of a moderate personal ambition."

Here is the case for the full-time Health Officer, as presented by the greatest sanitary statesman of all time; and the specifications are as valid today as they were fifty years ago. The demand for sanitarians with such qualifications is increasing year by year and for the moment at least this demand is far in excess of the supply. We hear much about meager remuneration and insecurity of tenure. Yet from my experience of nearly twenty-five years in the training of public health workers I can quote the conclusion of the Psalmist that in this field "I have not seen the righteous forsaken nor his seed begging bread." When a health officer with proper qualifications loses his position it is nine times out of ten as a result of temperamental characteristics which disqualify him for the successful execution of his task; and for every man who is hampered by political pressure there are a dozen other openings crying out for his expert direction. There is probably no one in this room who does not know of promising health programs whose execution is delayed for the lack of proper leadership; we could place five times the men who are now available in positions that would yield a reasonable living and a peculiarly stimulating and rewarding opportunity for service.

The demand for public health workers has been clearly foreseen by the un-

versities and has been generously provided for by farsighted corporations and individuals. In addition to the schools of public health at Harvard, Johns Hopkins, Michigan, Columbia and Yale which are represented on this morning's program, there are half a dozen other universities in the United States offering courses leading to the Certificate in Public Health, the Master of Science in Public Health and the Doctorate in Public Health and Dr. McLaughlin has outlined to you the progress which has been made by the American Public Health Association toward the coördination and standardization of courses of this kind. I have the honor at present of being the chairman of the Committee on the Standardization of Public Health Training of the American Public Health Association and I earnestly hope that in the future we may have the support of the American Medical Association in our complex task.

In general then we may say that the opportunity for the sanitarian is here and that there is no lack of educational facilities to prepare him for his task. What we do lack is men of the right sort to enter the field, by the avenues which have been provided. There are many types of workers needed in the modern public campaign, public health nurses, nutrition experts, experts in physical training, dentists, psychologists, statisticians, sanitary engineers, inspectors, bacteriologists, entomologists, social workers, chemists, lawyers and health educators. In many of these lines the recruits are coming forward in reasonably satisfactory numbers and of reasonably satisfactory quality. Our schools of public health have for example a good list of non-medical candidates for the C.P.H. who are specializing in the laboratory field. It is recruits from the medical profession, however, who are lacking and it is precisely these recruits that we most need in order to fill satisfactorily the larger administrative positions in the public health service. The public health movement is rapidly taking on new aspects and its emphasis is every year, less and less on the sanitation of the environment and on the bacteriological control of the contact-borne infections—more and more on the application of medical knowledge to the early detection and preventive treatment of disease. We need medical men to direct infant welfare work and medical school examination, tuberculosis clinics and venereal disease campaigns, to say nothing of the great public health problems of the future which are facing us in connection with the control of the degenerative diseases. Yet the medical men who are entering our schools of public health are for the most part either foreigners on Foundation fellowships or men in the forties who have retired from active practice who have necessarily lost some of the adaptability which would fit them for the most effective work in a new field; a field furthermore which, on account of their age, they expect to enter near the top and not near the bottom. Nowhere do we find a substantial quota of recent graduates from the best medical schools who are planning from their graduation to enter the profession of public health. Dr. Ferrell has estimated that we could absorb in the public-health field 10 per cent of the medical students who are graduated each year and we are not getting one-tenth of 1 per cent. The results presented by Professor E. O. Jordan at the Surgeon General's conference a year ago, based on a questionnaire sent to the medical students of four different universities, was exceedingly significant in indicating the reasons for our failure, at this one point where it is most important that we should succeed. Out of 461 students replying, 358 had never even considered entering public health work and the attitude which their replies exhibited indicated not merely ignorance, but general and deep-seated prejudice against this form of public service.

It is my strong conviction that the

recruitment of the best type of young medical graduates as the leaders of the public health movement of the future is a primary essential for the success of our cause. The health officer of to-morrow must be the leader in a vigorous and a purposeful campaign against each and every disease which takes an important toll of human life for there is not one of these diseases which is not in some measure within the range of possible control. This campaign is by no means to be won by the application of ordinances and the use of the police power. It calls for the intelligent and hearty coöperation of the medical profession and of the general public. Not only hospital service and dispensary and nursing service, but the work of every private physician, forms a part, and a supremely important part of the community machinery for the prevention of disease. If the health officer and the practitioner are in conflict, both public health and private medicine must suffer. If they coöperate in a broad spirit of service, each step that is taken will be soundly planned for the true advancement of the health of the public and effectively safeguarded so that the standards of medical practice and the well being of the individual practitioner may be secured. The man who is to envisage these broad problems of sanitary statesmanship must be much more than a clinician. He must be a master of public health in all its varied aspects and applications; but if he is to guide the great medical forces of the community he must be a man who commands the confidence and the loyalty of the medical profession as a whole.

How are we going to get these men? Clearly, for one thing, by making a career in public health more attractive, by providing for larger salaries, for more secure tenure of office, for wider opportunities of individual initiative. Yet I am convinced, as I have already indicated, that the bogies which frighten men from this path are more apparent than real—that public health offers to-day an opportunity for service which if rightly understood would gain its proper quota of those medical students whose tastes and instincts might draw them toward administration rather than to the career of the clinician or the investigator. The replies of the young men who answered Professor Jordan's questionnaire display a lack of such understanding which would constitute a delightful joke at the expense of some of us, if it were not so serious in its results. Dr. Edsall and I may wince a little and the rest of you may smile when we hear that "The medical profession does not itself take public health and preventive medicine seriously. This is just as true at Harvard as elsewhere"; or that "I have known nothing about public health work. I should have considered it probably seriously if I had known anything about it and might have entered it if it had been brought to my attention. I never heard of a public health school, although I am a B.A. of Yale and an M.A. of Columbia." When, however, an undergraduate writes that "No physician with the ability to practice medicine would want to go into public health where the services can be competently performed by any good bacteriologist or laboratory technician who, with the help of a small office force, can get out a volume of vital statistics per annum" we do not feel like smiling. The first and most fundamental need in facilitating the recruitment of the public health service is the need for a better comprehension on the part of the medical undergraduate, the need for a radical change of atmosphere in the medical school itself. Without such a change we must continue to struggle along with the leadership of non-medical sanitarians and of such medical men as may drift into the public health profession more or less through accident in later life. At Yale University we have come to the conclusion that one of the most important tasks of the medical school is to effect exactly this change of atmosphere and our Dean and Faculty

have set themselves with enthusiasm to bring about such a result.

The first essential factor in this problem is the one which Dr. Edsall will discuss in the next address, the question of the place and the content of a course in public health in the undergraduate medical curriculum. It was clear to us from the beginning that the second year was no place for such a course unless the subjects were to be regarded as an accidental and unimportant offshoot from bacteriology. For some time we placed the course in the third year, but here we found it came into serious conflict with the clinical work of the students, just admitted to the wards of the hospital, naturally and properly preoccupied with the fascinating problems of disease in the individual human body. We have now transferred our course to the first half of the fourth year, where it is allowed ninety hours of lectures, discussion, and field work. By the fourth year the student has sufficient medical knowledge to realize what the modern public health campaign really may mean; and our effort is to include in the course a summary and a synopsis of the broader community applications of all that he has learned during his preceding three years, and to bring them into proper relation to the movement as a whole. The results, so far as interest and enthusiasm are concerned, have been beyond our anticipation and are in sharpest contrast with the lack of response manifested by third year students in preceding years.

Our second step at Yale has been a decrease in the amount of the required class work for the medical degree, reducing it by the extent of about one-fourth of the curriculum of the past. Of the time saved in this manner a substantial part is to be kept free for a little of the assimilation and independent thinking which should form a part of any proper plan of education, and which has been impossible in the overcrowded curriculum of recent years. The remaining time, distributed through the last three years of the course, is to be devoted to elective work in a particular line chosen by each student. It may be clinical medicine or pathology or anatomy or public health, and already in the present second year class a few men with leanings in our direction are beginning to specialize in the public-health field. Those who do so to the maximum possibility, and in addition put in one summer in special work, can take the degree of Doctor of Public Health in one year, instead of two, after the completion of the work for the medical degree.

The third and most important factor upon which we rely at Yale is a fundamental change in the atmosphere of the teaching in every branch of study throughout the four years. Dean Winternitz and the members of the medical faculty have outlined a policy which involves the centering of our whole university hospital around the dispensary and the centering of the dispensary around the health clinic; and each course, from pathology to pediatrics, is imbued throughout with a new idea, that the function of the physician is to promote health, and not merely to alleviate architecturally completed disease. In proportion as this spirit prevails in the medical schools of the country, shall we gain the recruits whom we so much need to carry on the campaign for the protection of the public health; and we shall do much more than fill the vacant administrative positions which are waiting on every hand. As Sir Arthur Newsholme has said the public health campaign is to-day a problem which cannot be solved by official administrative effort alone. "There will not be complete success until means are discovered for training and enlisting every medical practitioner as a medical officer of health in the circle of his private or public practice, and of securing his services not only in the early and prompt detection of disease, but also in the systematic supervision during health of the families under his care, and in

advising them as to habits or methods of life which are inimical to health." Professor John M. Dodson in the *Journal of the American Medical Association* for January 6, 1923, has presented an admirable picture of the part which the idea of prevention should play in the work of the individual practitioner. Every word that he says is true and the public is to-day reaching a point of general education where the layman knows that it is true. The community wants preventive medicine, the individual wants preventive medicine; but preventive medicine as a reality and not a pious phrase, can come only as the result of a new vision and a new ideal within the walls of the medical school.

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THE MEDICAL PROFESSION AND THE LAITY FROM THE STANDPOINT OF THE HEALTH OFFICER*

W. S. RANKIN, M.D., FELLOW A. P. H. A.
Secretary North Carolina State Board of Health, Raleigh, N. C.

THE health officer occupies a strategic position for observing the relation of the public and the profession. He stands midway between the two. If he has a normal binocular vision, he will observe the interests of the public and the profession as a single object. Only those health officers who suffer from disturbances of vision are annoyed by the diplopia which separates the interests of the public and the profession into two blurred objects. The single object, which the health officer sees, uniting the interests and ultimately the forces of both the public and profession is a great field of need for medical services—a field of unsupplied medical needs, which is from three to five times as large as that which is supplied.

The health officer sees 2,750,000 women confined annually in the United States, and 30 per cent, or 750,000 of them, without medical attendant. He sees these women pass through their pregnancy with but one-fifth of the professional supervision that our colleges and textbooks teach they should have. He sees them inadequately attended during their puerperium, receiving on an average three or four visits where they should have ten or twelve. As a result of all this neglect of life at its source, he sees unnumbered abortions, miscarriages, premature labors and other complications of pregnancy, accidents of delivery with injuries and infections, with retarded and abnormal lying-in periods—in short, he sees countless women impaired for the functioning of motherhood, for the discipline of childhood and for the efficient discharge of those domestic duties upon which is dependent, to a large extent, not only the health of the infant but that of the family.

From damaged motherhood how short the step to impaired infancy! The health officer sees, as a result of the neglect of motherhood, infancy denied its birthright and given the mess of pottage instead, and in consequence, a large percentage of the 1,500,000 cases of well marked diarrhea and enteritis which annually affect our 5,000,000 infant population. Moving on, without a break in the continuity of the bond that relates one diseased state to another, the health officer sees early childhood with 700,000 cases annually of the common communicable diseases, and pauses in thought, long enough to realize that much of the loss and damage to life by this group of diseases is dependent upon the sort of infancy the victims suf-

* Read before the mid-winter meeting of the Council on Health and Public Instruction of the American Medical Association, Chicago, March 6, 1923.

fered. He sees, lying just beyond and closely related to impaired motherhood, abnormal, and diseased infancy, the great problem of malnutrition, involving, according to the lowest estimate, 2,000,000, or, according to the highest estimate, 4,000,000 of the public school children of this country. He observes malnutrition with its roots in infancy and its rootlets in functionless mammary glands. Another step in pathological sequence, and he sees the common defects of childhood, for which, according to Emerson, malnutrition is 80 per cent responsible. The common defects involve 1,000,000 public school children who suffer from diseased tonsils and adenoids, 4,000,000 who have visual defects, and 15,000,000 who need dental treatment—all of them retarded and retarding the school machinery of this country.

From childhood the health officer moves on to adolescence and observes 2,000,000 fresh cases of venereal diseases occurring annually—these added to the tremendous carry over of old cases and complications for last year and other years. He notes that this class of diseases largely supports three specialties and then generously contributes to the general run of practice, and finds that these diseases and their complications are not receiving one-fifth the treatment which, in the interests of both the profession and society, they should have.

He takes one more hasty glance at the uncultivated field of medicine and observes that but one-fifth of the diseases of adult life which need medical treatment are receiving it. "Surely the fields are white unto the harvest, but the laborers are few." The field of medicine that is occupied is not more than one-third, or more probably one-fifth, the field of existing and urgent medical need.

Finally, he understands that when medicine has gained control, to a reasonable adequate degree, over the pathological phases of life, then it will be time for the profession to begin to consider the yet larger opportunity for service—the opportunity that relates itself not to the small per cent of the population that is obviously diseased, but to the larger per cent of the population that is apparently well. To make the unfit fit is a worthy task, but to make the fit fitter is a larger and a higher achievement. The dentist, the pediatrician, and the industrial hygienist are already pioneering in this new and larger field of medicine—the field of health promotion as contrasted with that of disease prevention.

To summarize, the health officer sees a great opportunity in the enormous existing surplus of disease, and he sees an even greater opportunity in the possibilities of health promotion—the two opportunities constituting a problem of transcendent mutual interest to public and profession alike. The solution of this great problem of disease and health calls for two things: (1) scientific knowledge, and (2), social action. The medical profession is long on the one and short on the other.

As an organization designed to promote scientific training and the application of scientific principles in the treatment of disease in private and hospital practice, we have in the American Medical Association about all that could be desired. Through an educationally selective process, medicine takes the material with which she provides for loss and growth of her organization from a very high grade mental quality. Through four hard years of trial and tribulation in the medical school, she subjects the well chosen material to an even more rigorous process of elimination and finally retains only the best. After graduation the young doctor is taken into the fold, becoming a member of his county, state, and national organization, where he remains under the general tutelage of his profession which advances him in rank and reputation, as a rule, in proportion to his advancement as a scientist. Thus we see that medicine both in theory and art tends to the development of a highly refined scientific

product. There is a principle in nature that all organs and combinations of organs have a limitation of function, and that related organs and functions may undergo compensatory gain and loss. Medicine, in developing a scientist, creates a type that is a profound thinker, but not a broad thinker. Some time ago, a professional friend called my attention to an interesting observation of his, that the graduates of a certain well known medical school, highly reputed for its very thorough and exhaustive scientific teaching, were taking less interest in the social and public affairs of their local medical societies, their town, city and state governments than the graduates of any other medical school. On subjecting my friend's observation to rather careful study I arrived at his conclusion. He, who looks through a microscope at the microcosm, has little time to look through the telescope at the macrocosm. In highly developing the scientific insight, there is compensatory disuse and atrophy of the social outlook.

Medicine not only has poor vision when it comes to seeing socially, but she has a defective constitution when it comes to acting organically. There is a reason for this. A house cannot be made out of brick alone, no matter how fine the quality of the brick. A certain amount of soft, plastic mortar to hold the brick together and to give the building solidity and stability is necessary. Just so, an organization cannot be made up of leaders alone. A certain proportion of followers to hold the leaders together is necessary for organic strength. Our profession, through its carefully selective process of chosing its material, has created a structure of hard, angular, expensive brick of fine quality, but has used possibly too little soft, sticky mortar to hold them together. Hence, there is in the profession too much divergence of opinion, division, and destructive criticism, and too little convergence of opinion, organic union and action based on constructive suggestions.

To bring about this enlarged social viewpoint and organized action on the part of the profession, two things are necessary: The first thing is the teaching of public health and medical sociology in the medical schools, giving the medical student a broad as well as a profound vision of his problems. The second thing is to set up effective machinery in the component societies, constituent associations, and the American Medical Association for dealing with the social obligations and opportunities of the profession.

In order to set up machinery for the social functioning of the profession, it will be necessary for the initiative to be taken in Chicago. The trustees should provide for an organization of a national committee on public policy, arranging for the appointment of one member of this committee from each state, the state representative to serve for one year. This national committee should meet, not later than this fall, and formulate a system of standard policies and procedures for state committees on public policy to consider and act upon. The national representative from each state should organize a state committee on public policy, appointing one member of such a committee from each county medical society, the member so appointed to serve one year. The county appointee in turn should organize, through his county medical society, a county committee on public policy of three members. Each state chairman should arrange for a meeting of the county chairmen, the county chairmen constituting the state committee on public policy, at which time the recommendations of the national committee would be considered, and the state committee would adopt a system of standard policies and procedures for dealing with medical matters of public interest. Finally, the recommendations of the state committee would be laid before each county committee on public policy and, through the county committee, the county medical society would define its position on all matters of pub-

lic interest related to its work and membership. After the first year's organization and work, each county medical society would select its own committee on public policy, the chairman of that committee automatically becoming a member of the state committee on public policy. The state committee would meet and organize, its chairman becoming a member of the national committee on public policy.

The national committee on public policy should nominate to the President of the Association and members of the Council on Health and Public Instruction, which the President in turn should nominate to the House of Delegates. The Council on Health and Public Instruction should be adequately provided in budget and personnel to assume the active executive work of the national committee on public policy.

It is important that those of our profession who stand in the high places, catch the larger vision, and receive the inspiration of lofty ideals should not forget that the rank and file, who are down in the valley and unable to see our professional Canaan, are growing restive for some sort of leadership for dealing with their social problems. There is a danger that, like those other people, finding themselves without broad-visioned social leadership, they should gather themselves together, and say unto some false leader: "Up! make us gods which shall go before us; for as for this man Moses, the man that brought us up out of the land of Egypt, we wot not what has become of him." Surely, our true leaders will not permit the profession, uncertain as to its future, to wander in a wilderness of confused policies, to bring themselves together under false leaders, to bow down to the golden calf of commercialism, and forego the possessions of their rightful inheritance for forty years.

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ALBERT'S TOLUIDIN BLUE AS A ROUTINE STAIN FOR DIPHTHERIA BACILLI

C. A. PALMERLEE

Bacteriologist, Department of Health, Battle Creek, Michigan

DURING the last twenty-five years almost every year has seen the introduction of some new stain or a modification of the method of using some previous stain, to serve as either a substitute for Loeffler's alkaline methylene blue, or as a confirmatory stain to be used in conjunction with it. Regardless of these varied stains Loeffler's methylene blue has practically maintained its position as the standard routine stain. Perhaps to a large extent this is due to the amount of work that has been done in interpreting the results by this stain and the classifications familiar to all into which the group of diphtheria-like organisms are divided. I wish to present, not a new stain, but some results with a previously reported stain used over a considerable period both amplifying the Loeffler's stain and alone. It has, in our opinion, several points of advantage over methylene blue, simplifying the varied classifications and combining in one stain the advantages of several methods.

In 1920[1] Dr. Henry Albert introduced a formula for a diphtheria stain making use of an acid solution of toluidin blue, with a solution of Gram's iodine to make the differential diagnosis more pronounced. The formula for the stain as described by him is as follows:

SOLUTION NO. 1

Toluidin Blue	0.15	grams
Acetic Acid (Glacial)	1	c.c.
Alcohol (95%)	2	c.c.
Water	100	c.c.

SOLUTION NO. 2

Iodine	1.0	grams
Potassium Iodide	2.0	grams
Water	300	c.c.

The fixed smear is stained from four to five minutes in solution No. 1, then treated with iodine solution without washing until the field shows as an even brown or iodine color (approximately 20 to 30 seconds). In our use of the stain the slides are first placed in solution No. 1, using a Coplin jar, and then treated with solution No. 2 from a dropping bottle, as when the two solutions are mixed a rapid decomposition of the toluidin blue takes place.

This stain has been in use in this laboratory since January, 1921. For approximately the first six months of 1921 it was used to confirm reports made by Loeffler's methylene blue. During the fall of 1921 Albert's stain was used in the examination of all school cultures and routine diagnostic cultures, using, in all positive cultures and many negative cultures, Loeffler's stain to confirm the diagnosis. Since that date Albert's stain has been used almost exclusively in the examination of cultures for diphtheria, making a total of approximately 20,000 examinations.

Albert's stain may well be considered as primarily a differential stain, whereby the granules and bars of the bacilli take an intense violet color and the body of the bacillus a faint brown from the iodine. The other bacteria are subordinated to such an extent that they show only faintly. In examining stained specimens under the microscope, obviously when diphtheria bacilli are present, they, through their intensely staining granules and bars, will stand out in sharp contrast to the rest of the field. The only two occasions in which there are any other intensely stained objects in the field are (1) An occasional streptococcus, apparently a consistently staining type, which is readily distinguished from true polar bodies by being larger in size, and the body of the bacillus being absent; (2) some bacilli of the subtilis group which show large granules but which are readily eliminated from consideration on account of their morphology.

The author of the stain has made a classification of diphtheria bacilli according to his stain into two main divisions,[2] barred and granular, with four subdivisions of each group depending upon the size of the bacillus. It has been our experience that the barred types are much the less frequently met with and in cultures where barred types are present there will almost invariably be a certain proportion of granular forms.

A comparison with the Westbrook[3] types met with by us in routine diagnosis and as determined by the Albert stain was as follows:

Westbrook	*Toluidin Blue*
Type A. (Granular)	Granular (Generally one large granule at one end with at times one to three other smaller granules).
Type A. 1. (Barred)	Granular and barred.
Type A. 2. (Solid staining)	Not encountered except rarely as an occasional form in mixed cultures.
Type B. (Granular)	Granular.
Type B. 1. (Barred)	Granular with occasional barred forms.
Type C. (Granular)	Granular.
Type C. 1. (Barred)	Granular and barred.
Type D. (Granular)	Granular.
Type D. 1. (Barred)	Granular.
Type D. 2. (Solid staining)	None found showing either granules or bars.
Type E. 2. (Solid staining)	Neither granules nor bars present.

All cultures from clinical cases of diphtheria have shown a predominance of the granular forms. Fourteen virulence tests made with cultures from clinical cases of diphtheria showing granular forms have all shown toxin production. Twenty-six virulence tests with cultures showing granular forms from cases pronounced "carriers," *i.e.*, those in which no more than mild local reaction were observed have all shown toxin production. Twenty-two virulence tests with cultures in which no granular forms were found have all shown no toxin production. Twenty-eight virulence tests with cultures showing granular forms from release cultures on cases of diphtheria whose local infection was difficult to clear up showed toxin production except in one instance. This case on a later test showed virulent bacilli. While the number of virulence tests here reported is too few in number to warrant a definite diagnosis of a virulent type of diphtheria bacillus on all granular forms, yet it seems reasonable to presuppose that fact pending a virulence test, in making a diagnosis. It would be well to reëmphasize the fact that all clinical cases of diphtheria which we have encountered have shown a preponderance of granular forms.

A stain of this nature subordinating as it does everything to the diphtheria organism is of immense value in the examination of large numbers of cultures and particularly those in which only occasional diphtheria bacilli are present. The routine staining of slides takes only a little longer than with methylene blue.

CONCLUSIONS

1. Albert's stain gives a clear cut picture of diphtheria bacilli, dividing them into two main classes, granular and barred, and solid staining.

2. We have met with no solid staining types that have shown any virulence.

3. All clinical cases of diphtheria show granular forms and so far as we have run virulence tests all granular forms have shown toxin production.

4. We have encountered no cultures of purely barred types, granular forms being present in varied numbers.

5. The stain is of great advantage to the operator in the examination of large numbers of cultures, and in cultures where only a few diphtheria bacilli are present.

6. It merits observation by a number of observers having large volumes of diphtheria cultures coming under their observation, that definite conclusions may be drawn as to its value as a routine stain.

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3. Bacteriology of Diphtheria. Nuttal & Graham-Smith.

□

The Mechanism of Bacteriostasis.—The author calls attention to the fact that bacteriocidal value of dyes cannot necessarily be judged by bacteriostasis. As an example he gives effect of acid fuchsin on B. prodigiosus and B. megaterium. On acid fuchsin agar B. prodigiosus grows well and B. megaterium not at all. When exposed directly to the dye B. prodigiosus is killed and B. megaterium grows well. A similar result is obtained with the flavines instead of acid fuchsin. Discrepancies between laboratory experiments and clinical results may be explained in part by these facts. The author states since certain dyes, like gentian violet, are highly bacteriostatic for some organisms which they penetrate little (B. subtilis), and are almost without bacteriostatic effect on others which they penetrate thoroughly (B. coli). It is certain that bacteriostasis is not entirely dependent on selective penetration. He believes there is evidence for the assumption that selective bacteriostasis depends on H-ion concentration at surface of bacteria.—John Churchman, New York. *Proc. Soc. Exp. Biol. and Med.*, **20**, 16, 1922.

THE IDENTIFICATION OF BACILLUS BOTULINUS AND ITS TOXIN IN CULTURE AND IN CANNED FOODSTUFFS BY SEROLOGICAL METHODS*

R. A. KELSER, D.V.M., M.A.
Captain, Veterinary Corps, U. S. Army

BOTULISM in man and the lower animals in the United States during the past few years has been the subject of much concern. The frequent reports of its occurrence, with fatal terminations in the great percentage of cases, has led numerous research workers to devote considerable time to a study of various phases of the problem. As a result of such work, our knowledge of botulism has been materially improved.

With the more general recognition accorded botulism, there has been a corresponding increase in the demand for laboratory examinations to determine whether or not various specimens of foodstuffs, particularly canned products, are contaminated with the organism.

So far as I am aware, immunologic tests with laboratory animals, supplemented in some instances by bacteriological study, constitutes the usual routine procedure followed by most laboratories for the identification of B. botulinus and its toxin. While such method is generally satisfactory, it frequently involves considerable time, particularly in instances where bacteriological examination is resorted to and where the material under examination is contaminated with other organisms besides B. botulinus. If the examination is being made in connection with a suspected outbreak of botulism, the importance of an early diagnosis is, of course, obvious.

Having in view a means by which the identification of this organism might be facilitated, the writer undertook a series of experiments with the complement-fixation test to study its value in demonstrating B. botulinus and its toxin in culture and in canned foodstuffs.

It will be recalled that attempts at diagnosing botulism in affected individuals and animals, through the use of the complement-fixation test, have been generally unsuccessful, due, undoubtedly, to the fact that the disease in most cases runs a short, acute course, which, in serious cases, terminates in death before complement-fixing bodies are present in detectable numbers in the blood stream. However, if an antitoxic serum from a hyperimmune animal be used as a positive serum, and a preparation of the culture or canned foodstuff under examination be titrated as antigen, a complement-fixation reaction can be obtained.

The experiments detailed in this paper demonstrate the value of the complement-fixation test in identifying whole bouillon cultures of B. botulinus; Berkefeld filtrates of both pure and contaminated cultures; saline suspensions of the toxin-free spores; and then, in the case of canned foodstuffs, the value of the test in demonstrating B. botulinus and its toxin in such products as asparagus, spinach, corn, string beans and sausage.

TECHNIC OF THE COMPLEMENT-FIXATION TITRATIONS

Before going into the results obtained in the various tests, the technic of the complement-fixation titrations, as carried out throughout all of the work reported in this paper, will be discussed. Full amounts of the various reagents were used rather than fractional amounts such as are commonly employed in the Wassermann test.

Four different lots of positive sera were made use of at various times in these tests. Two lots represented serum

* From the Veterinary Laboratory Section, Army Medical School, Washington, D. C.

from horses hyperimmunized against the toxin of B. botulinus type A, while the other two lots were from horses hyperimmunized against type B toxin. The negative serum used was that from normal horses, three different lots being employed during the tests. In all cases the serum was inactivated at 57.5° C. for one-half hour after it had been distributed in the various test tubes containing 2 c.c. of physiological salt solution.

The sheep-cell hemolytic system was made use of throughout this work. A 3 per cent suspension of sheep red blood corpuscles which were washed 5 times, glycerized anti-sheep-cell amboceptor, and fresh guinea pig serum for complement, constituted the reagents.

COMPLEMENT TITRATION

In titrating the complement a rack containing 15 test tubes is set up and to each tube 2 c.c. of physiological sodium chloride solution are added. A small amount of the complement is diluted to make a 4 per cent solution and of this .30, .35, .40, .45, .50, .55, .60, .65, .70, .75, .80, .85, .90, .95, and 1.00 c.c. respectively, are distributed in the 15 tubes. To each tube is then added 1 c.c. of amboceptor, representing 2 units when titrated against 1 c.c. of a 3 per cent suspension of washed sheep blood cells in the presence of 1 c.c. of a 5 per cent complement. Finally, the blood cells are added, distributing 1 c.c. of a 3 per cent suspension in each tube. After shaking, the rack is placed in the dry air incubator maintained at the usual temperature of 37.5° C., where it is allowed to remain for one-half hour.

At the expiration of the incubation period the rack is removed from the incubator and the complement unit noted. In the various tests herein recorded, 1½ units of complement, contained in 1 c.c. of physiological salt solution, were uniformly employed.

TITRATION OF THE ANTIGEN

Titrations of the various B. botulinus culture preparations and material from infected foodstuffs as antigens, for the identification of cultures and the detection of the organism and its toxin in canned goods are carried out as follows:

Twenty-four test tubes are placed in a double row rack, 12 tubes in each row. The first 9 tubes in each row are used for the graduated amounts of antigen. The remaining 3 tubes in each row are used for the various controls. Two cubic centimeters of physiological salt solution are placed in each tube. In each of the first 10 tubes of the rear row .15 c.c. of normal horse serum is added. In the front row .15 c.c. of antitoxic serum of horses hyperimmunized to the toxin of B. botulinus is placed in each of the first 10 test tubes. The tubes containing the serum are then placed in a water bath maintained at a temperature of 57.5° C. and allowed to remain there for one-half hour for inactivation of the serum.

The culture or food product to be used as an antigen, after being prepared as described in another part of this paper, is distributed in graduated amounts in the first 9 tubes in both the front and rear rows. The tenth tube in both the front and rear rows, containing respectively positive and negative serum, constitute the positive and negative serum controls and receive no antigen. In the front row of tubes containing the positive serum, it has been the practice, starting with the first tube, to use respectively .80, .60, .40, .30, .25, .20, .15, .10, and .05 c.c. of antigen. In the case of cultures, toxic culture filtrates, and washed spores used as antigens, it has been customary to use double the amounts of antigen in the tubes in the rear row containing negative serum. The range between the fixing unit and the anticomplementary amount with such antigens, is, as a rule, quite wide and is demonstrated by such procedure in the titration. With antigens prepared from some infected foodstuffs

this range is not always as wide as with the culture preparations. Hence, in the examination of such products, corresponding amounts of antigen are used with the positive and negative sera. As a routine procedure for the antigen control .80 c.c. of antigen, the maximum amount used with the positive serum, is placed in the eleventh tube in the rear row.

To all tubes in the rack, with the exception of the last tube in the front row which is used for the amboceptor control, 1 c.c. (1½ units) of titrated complement is added. The tubes are then well shaken and placed in the incubator for one hour.

After the hour of incubation, the rack is removed and 1 c.c. (2 units) of the anti-sheep-cell amboceptor is then distributed to all tubes but the last in the back row which serves for the complement control. Following this 1 c.c. of the 3 per cent suspension of washed blood cells is added to all tubes. After shaking, the tubes are again placed in the incubator for one hour after which time the rack is removed and the results of the test recorded.

The eleventh tube in the front row contains only reagents of the hemolytic system, constituting a check on that. The twelfth tube in the front row demonstrates the amboceptor incapable of producing hemolysis in the absence of the complement, while the corresponding tube in the rear row is to indicate the absence of hemolysins in the complement used.

In recording the results of the test, complete fixation of complement or inhibition of hemolysis, is indicated by the 4-plus symbol. The 3-plus, 2-plus and 1-plus symbols represent reactions in which inhibition of hemolysis was respectively approximately 75, 50 and 25 per cent complete. The plus-minus symbol indicates that there was less than approximately 25 per cent inhibition of hemolysis. Complete hemolysis with no trace of inhibition is signified by the minus sign.

THE IDENTIFICATION OF CULTURES OF B. BOTULINUS

In preparing cultures for identification by the complement-fixation test, several methods have been employed with good success. If the organism to be identified has been isolated in pure cultures, a slightly alkaline dextrose-beef-broth culture (1 per cent dextrose with a small quantity of chopped beef in each tube) 48 hours or more old is simply sterilized in the autoclave under 18 pounds pressure for 30 minutes, the fluid poured off and diluted with 1 to 3 parts physiological salt solution, according to the density of the culture, and titrated.

With broth cultures contaminated with other organisms it is best to test filtrates of the culture. Such cultures should be at least 5 days old. They are carefully filtered through asbestos wool and then through a Berkefeld filter of "N" porosity. This filtrate is then placed in the Arnold sterilizer for one hour to render harmless the toxin, if present. It is then titrated undiluted against B. botulinus antitoxic serum. Such cultural filtrates give exceedingly good results in cases where B. botulinus is present in the original culture. The reactions are clear-cut and there is usually a wide range between the complement-fixing unit with the positive serum and the anticomplementary point with the negative serum.

In the beginning of this work dextrose-beef-broth culture media, containing a small amount of sterile chopped beef, was employed. Lately, however, the beef heart peptic digest medium, recommended by Dubovsky and Meyer,[1] has been employed. These investigators found that the elaboration of toxin by impure cultures of B. botulinus is excellent in such medium.

Excellent complement-fixation reactions have also been obtained with antigens representing a suspension of washed B. botulinus spores. It is not necessary, however, to prepare such type of antigen to identify cultures of B. botulinus, the two methods above mentioned for pure

and mixed cultures, respectively, being the simplest, and giving entirely satisfactory results. However, where it is desired to keep on hand a very stable, concentrated antigen, for testing antitoxic serum for its complement-fixing value, and for control purposes, this washed spore antigen is highly satisfactory.

In preparing the spore antigen, old broth cultures containing a large number of spores are centrifugalized at high speed for one hour, the supernatent fluid pipetted off, sterilized and discarded. The spores are then pooled and washed twice with salt solution. After the second washing a rather heavy suspension is made of the organisms in physiological salt solution which is then sterilized by autoclaving for 30 minutes under 18 pounds steam pressure. The amount of suspension is then determined and sufficient of a 5 per cent solution of phenol added to make the antigen contain .50 per cent preservative. This is stored as a stock antigen and for titration is used in dilutions of from 1:10 to 1:25 according to its concentration.

Antigens prepared from type A cultures result in fixation of complement in the presence of type B antitoxic serum as well as with its homologous serum. Cross fixation likewise occurs with the type B antigens. At first it was thought that differentiation of types would be possible by demonstrating a greater affinity of an antigen of one type for antitoxic serum of the same type, such close relationship manifesting itself by causing fixation of complement in smaller amounts with its homologous serum than with heterologous serum. Subsequent work, however, with additional strains of B. botulinus indicate that such method cannot be relied upon.

Chart I shows the results of a titration in which several pooled broth cultures of B. botulinus type A, autoclaved and diluted with 2 parts of physiological salt solution, were used as an antigen. Chart II demonstrates the results ob-

CHART I

B. BOTULINUS ANTIGEN TITRATION

(Autoclaved Broth Culture)

Boise Strain, Type A

Serum Used	Degree of Complement-Fixation with Graduated Amounts of Antigen									Controls		
	1.60 c.c.	1.20 c.c.	.80 c.c.	.60 c.c.	.50 c.c.	.40 c.c.	.30 c.c.	.20 c.c.	.10 c.c.	Neg. Serum	Antigen	Ambo.
Normal Horse Serum (.15 c.c. in each tube)	±	—	—	—	—	—	—	—	—	—	—	4 +
Antitoxic	.80 c.c.	.60 c.c.	.40 c.c.	.30 c.c.	.25 c.c.	.20 c.c.	.15 c.c.	.10 c.c.	.05 c.c.	Pos. Serum	Hem. System	Ambo.
Horse Serum Type A (.15 c.c. in each tube)	4 +	4 +	4 +	4 +	4 +	4 +	4 +	2 +	±	—	—	4 +

CHART II

B. BOTULINUS ANTIGEN TITRATION

(Autoclaved Broth Culture)

Nevin Strain, Type B

Serum Used	Degree of Complement-Fixation with Graduated Amounts of Antigen									Controls		
	1.60 c.c.	1.20 c.c.	.80 c.c.	.60 c.c.	.50 c.c.	.40 c.c.	.30 c.c.	.20 c.c.	.10 c.c.	Neg. Serum	Antigen	Comp.
Normal Horse Serum (.15 c.c. in each tube)	±	—	—	—	—	—	—	—	—	—	—	4 +
Antitoxic	.80 c.c.	.60 c.c.	.40 c.c.	.30 c.c.	.25 c.c.	.20 c.c.	.15 c.c.	.10 c.c.	.05 c.c.	Pos. Serum	Hem. System	Ambo.
Horse Serum Type B (.15 c.c. in each tube)	4 +	4 +	4 +	4 +	4 +	4 +	4 +	3 +	1 +	—	—	4 +

tained, with an antigen prepared in the same manner with type B cultures.

In the titrations shown in Charts III and IV filtered toxic, broth cultures, eight days old, of B. botulinus types A and B, contaminated with B. sporogenes and Staphylococcus pyogenes aureus, were used as antigens following heating in the Arnold sterilizer for one hour.

Charts V and VI indicate the results obtained with spore antigens prepared respectively from type A and B strains of B. botulinus.

In Chart I it will be noted that fixation of complement was complete in the tube containing .30 c.c. of antigen and the positive serum. In the presence of the negative serum 1.20 c.c. of this antigen did not interfere with hemolysis. The largest amount (1.60 c.c.) employed with the negative serum caused a slight amount of inhibition. With the type B culture

CHART III

B. BOTULINUS ANTIGEN TITRATION

(Toxic Culture Filtrate)

Boise Strain, Type A Contaminated with B. sporogenes and Staphylococcus pyogenes aureus

Serum Used	Degree of Complement-Fixation with Graduated Amounts of Antigen									Controls		
	1.60 c.c.	1.20 c.c.	.80 c.c.	.60 c.c.	.50 c.c.	.40 c.c.	.30 c.c.	.20 c.c.	.10 c.c.	Neg. Serum	Antigen	Comp.
Normal Horse Serum (.15 c.c. in each tube)	—	—	—	—	—	—	—	—	—	—	—	4 +
Antitoxic	.80 c.c.	.60 c.c.	.40 c.c.	.30 c.c.	.25 c.c.	.20 c.c.	.15 c.c.	.10 c.c.	.05 c.c.	Pos. Serum	Hem. System	Ambo.
Horse Serum Type A (.15 c.c. in each tube)	4 +	4 +	4 +	4 +	4 +	4 +	4 +	4 +	2 +	—	—	4 +

CHART IV

B. BOTULINUS ANTIGEN TITRATION

(Toxic Culture Filtrate)

Nevin Strain, Type B Contaminated with B. sporogenes and Staphylococcus pyogenes aureus

Serum Used	Degree of Complement-Fixation with Graduated Amounts of Antigen									Controls		
	1.60 c.c.	1.20 c.c.	.80 c.c.	.60 c.c.	.50 c.c.	.40 c.c.	.30 c.c.	.20 c.c.	.10 c.c.	Neg. Serum	Antigen	Comp.
Normal Horse Serum (.15 c.c. in each tube)	—	—	—	—	—	—	—	—	—	—	—	4 +
Antitoxic	.80 c.c.	.60 c.c.	.40 c.c.	.30 c.c.	.25 c.c.	.20 c.c.	.15 c.c.	.10 c.c.	.05 c.c.	Pos. Serum	Hem. System	Ambo.
Horse Serum Type B (.15 c.c. in each tube)	4 +	4 +	4 +	4 +	4 +	4 +	2+	±	—	—	—	4 +

CHART V

B. BOTULINUS ANTIGEN TITRATION

(Killed Washed Spores)

Boise Strain, Type A

Serum Used	Degree of Complement-Fixation with Graduated Amounts of Antigen									Controls		
	1.60 c.c.	1.20 c.c.	.80 c.c.	.60 c.c.	.50 c.c.	.40 c.c.	.30 c.c.	.20 c.c.	.10 c.c.	Neg. Serum	Antigen	Comp.
Normal Horse Serum (.15 c.c. in each tube)	±	—	—	—	—	—	—	—	—	—	—	4 +
Antitoxic	.80 c.c.	.60 c.c.	.40 c.c.	.30 c.c.	.25 c.c.	.20 c.c.	.15 c.c.	.10 c.c.	.05 c.c.	Pos. Serum	Hem. System	Ambo.
Horse Serum Type A (.15 c.c. in each tube)	4 +	4 +	4 +	4 +	4 +	4 +	3 +	1 +	±	—	—	4 +

CHART VI
B. BOTULINUS ANTIGEN TITRATION
(Killed Washed Spores)
Nevin Strain, Type B

Serum Used	Degree of Complement-Fixation with Graduated Amounts of Antigen									Controls		
	1.60 c.c.	1.20 c.c.	.80 c.c.	.60 c.c.	.50 c.c.	.40 c.c.	.30 c.c.	.20 c.c.	.10 c.c.	Neg. Serum	Antigen	Comp.
Normal Horse Serum (.15 c.c. in each tube)	—	—	—	—	—	—	—	—	—	—	—	4 +
Antitoxic	.80 c.c.	.60 c.c.	.40 c.c.	.30 c.c.	.25 c.c.	.20 c.c.	.15 c.c.	.10 c.c.	.05 c.c.	Pos. Serum	Hem. System	Ambo.
Horse Serum Type B (.15 c.c. in each tube)	4 +	4 +	4 +	4 +	4 +	4 +	4 +	4 +	2 +	—	—	4 +

(Chart II), essentially the same results were obtained as with the type A culture shown in Chart I.

From Chart III it will be seen that the toxic culture filtrate from a contaminated culture of B. botulinus, type A, gave complete fixation of complement in .20 c.c. In the presence of negative serum, the largest amount of antigen used (1.60 c.c.) did not inhibit hemolysis. With the toxic culture filtrate of B. botulinus, type B, also contaminated (Chart IV), .40 c.c. resulted in perfect fixation of complement, whereas 1.60 c.c. did not cause inhibition of hemolysis in the presence of negative serum.

The type A spore antigen used in the titration shown in Chart V gave complete fixation of complement in .40 c.c., was not inhibitory in 1.20 c.c. amounts, but slightly so where 1.60 c.c. were used. The type B spore antigen (Chart VI) was superior to the type A antigen, fixing the complement completely in .20 c.c. amounts and not being inhibitory in the largest amount (1.60 c.c.) used with the negative serum.

DETECTION OF B. BOTULINUS AND ITS TOXIN IN CANNED FOODSTUFFS

INOCULATION OF CANNED FOODSTUFFS WITH B. BOTULINUS

A number of specimens of canned asparagus, spinach, string beans, corn and sausage were inoculated at different times throughout these investigations.

At first the method simply consisted of thoroughly washing the outside of the can with a 3½ per cent solution of liquor cresolis compound, flaming an area of the top, and after making a small hole with a sterile nail, inoculating a few drops of a bouillon culture of B. botulinus into the bottom of the can with a sterile pipette. The hole was then immediately sealed with solder and the can placed in the incubator. After three days in the incubator the cans were removed and kept at room temperature for several days until tested.

Because it was desired to permit but limited active growth of the organism in the canned products, the practice of removing the canned material with aseptic precautions to sterile glass bottles for inoculation was later adopted. By this method it was possible to watch the specimens and remove them from the incubator shortly after the growth was indicated by rising gas bubbles. After removal from the incubator the specimens were placed in the ice box until tested.

The bottles used were of the wide mouth variety, of white glass, and of 500 c.c. capacity. They were fitted with rubber stoppers through which a piece of glass tubing, constricted in the middle, had been passed. The ends of the tubes were plugged with cotton. After inoculating the material the stoppers were placed tightly in the bottles, tied and sealed with paraffine. The air was exhausted from each bottle by connecting to the vacuum system and the glass tube sealed off at the constriction. The

bottles were then put in an enamel bucket and placed in the incubator. After removing the inoculated food products from the incubator the sealed glass tips of the bottles were broken off under a piece of absorbent cotton moistened with antiseptic solution. This precaution was taken to guard against the possible "blowing out" of the stoppers by accumulated gas, with the escape of infectious material. In no case, however, had growth of the organisms been sufficient to produce appreciable gas pressure when the tips of the tubes were broken.

PREPARATION OF ANTIGENS FROM INOCULATED CANNED FOODSTUFFS

In the case of the vegetables the fluid from each inoculated bottle was carefully drawn off into sterile Erlenmeyer flasks with the aid of a pipette and rubber bulb. With some products such as spinach, when the amount of free fluid was small, it was occasionally necessary to express the fluid from the mass with the aid of a spatula, pressing the mass against the wall of the bottle. All pipettes and other apparatus coming in contact with the infected material should, of course, be promptly sterilized in the autoclave.

In the case of the inoculated sausage there was no appreciable amount of fluid present. Several ounces of the infected material were, therefore, macerated in a mortar with 50 c.c. of distilled water. The mass was then placed in a funnel containing cheese cloth and the fluid squeezed through the cloth into an Erlenmeyer flask by twisting the free border of the cheese cloth around the soaked material and bringing pressure on it with a spatula. In the early tests the fluids were passed through absorbent cotton filters several times to remove as much suspended material as possible. Later, however, it was found that filtration through paper gave better results. The filtered material was sterilized in the autoclave at 18 pounds pressure for 30 minutes. Usually after sterilizing more precipitate is formed. This should be allowed to settle and the supernatent fluid drawn off for the test.

TITRATION OF THE ANTIGENS

In the tests for the identification of B. botulinus and its toxin in these antigens, the titration technique was such as has already been described. The only variation from that employed in connection with the identification of cultures was, as has already been pointed out, the use of corresponding amounts of antigen in the tubes containing negative and positive serum, rather than twice the amount in the negative serum tubes.

As controls on the antigens prepared from inoculated canned goods, a series of titrations were carried out with antigens prepared from sound, uninoculated canned asparagus, string beans, spinach, and corn. The results were consistently negative.

Charts VII and VIII indicate the results obtained with antigen prepared from two lots of asparagus inoculated respectively with B. botulinus types A and B. The reactions obtained with antigens prepared from canned string beans and spinach, inoculated with the type B

CHART VII

TITRATION OF FLUID FROM INOCULATED ASPARAGUS AS B. BOTULINUS ANTIGEN
(Inoculated with Type A Culture)

Serum Used	Degree of Complement-Fixation with Graduated Amounts of the Fluid									Controls		
	.80 c.c.	.60 c.c.	.40 c.c.	.30 c.c.	.25 c.c.	.20 c.c.	.15 c.c.	.10 c.c.	.05 c.c.	—S	Ant.	Conj.
Normal Horse Serum (.15 c.c. in each tube)	—	—	—	—	—	—	—	—	—	—	—	4 +
Antitoxic Horse Serum Type A (.15 c.c. in each tube)	4 +	4 +	4 +	4 +	4 +	2 +	1 +	±	±	+ S	H. S.	Ambo.
										—	—	4 +

CHART VIII

TITRATION OF FLUID FROM INOCULATED ASPARAGUS AS B. BOTULINUS ANTIGEN
(Inoculated with Type B Culture)

SERUM USED	DEGREE OF COMPLEMENT-FIXATION WITH GRADUATED AMOUNTS OF THE FLUID									CONTROLS		
	.80 c.c.	.60 c.c.	.40 c.c.	.30 c.c.	.25 c.c.	.20 c.c.	.15 c.c.	.10 c.c.	.05 c.c.	—S	Ant.	Comp.
Normal Horse Serum (.15 c.c. in each tube)	—	—	—	—	—	—	—	—	—	—	—	4 +
Antitoxic Horse Serum Type B (.15 c.c. in each tube)	4 +	4 +	4 +	4 +	4 +	4 +	2 +	±	±	+ S	H. S.	Ambo.
										—	—	4 +

CHART IX

TITRATION OF FLUID FROM INOCULATED CANNED STRING BEANS AS B. BOTULINUS ANTIGEN
(Inoculated with Type B Culture)

SERUM USED	DEGREE OF COMPLEMENT-FIXATION WITH GRADUATED AMOUNTS OF THE FLUID									CONTROLS		
	.80 c.c.	.60 c.c.	.40 c.c.	.30 c.c.	.25 c.c.	.20 c.c.	.15 c.c.	.10 c.c.	.05 c.c.	— S	Ant.	Comp.
Normal Horse Serum (.15 c.c. in each tube)	—	—	—	—	—	—	—	—	—	—	—	4 +
Antitoxic Horse Serum Type B (.15 c.c. in each tube)	4 +	4 +	4 +	4 +	4 +	2 +	±	±	—	+ S	H. S.	Ambo.
										—	—	4 +

CHART X

TITRATION OF FLUID FROM INOCULATED SPINACH AS B. BOTULINUS ANTIGEN
(Inoculated with Type B Culture)

SERUM USED	DEGREE OF COMPLEMENT-FIXATION WITH GRADUATED AMOUNTS OF THE FLUID									CONTROLS		
	.80 c.c.	.60 c.c.	.40 c.c.	.30 c.c.	.25 c.c.	.20 c.c.	.15 c.c.	.10 c.c.	.05 c.c.	— S	Ant.	Comp.
Normal Horse Serum (.15 c.c. in each tube)	—	—	—	—	—	—	—	—	—	—	—	4 +
Antitoxic Horse Serum Type B (.15 c.c. in each tube)	4 +	4 +	4 +	3 +	3 +	±	—	—	—	+ S	H. S.	Ambo.
										—	—	4 +

CHART XI

TITRATION OF FLUID FROM INOCULATED CANNED CORN AS B. BOTULINUS ANTIGEN
(Inoculated with Type A Culture)

SERUM USED	DEGREE OF COMPLEMENT-FIXATION WITH GRADUATED AMOUNTS OF THE FLUID									CONTROLS		
	.80 c.c.	.60 c.c	.40 c.c.	.30 c.c.	.25 c.c.	.20 c.c.	.15 c.c.	.10 c.c.	.05 c.c.	— S	Ant.	Comp.
Normal Horse Serum (.15 c.c. in each tube)	±	—	—	—	—	—	—	—	—	—	±	4 +
Antitoxic Horse Serum Type A (.15 c.c. in each tube)	4 +	4 +	4 +	4 +	4 +	3 +	±	—	—	+ S	H. S.	Ambo.
										—	—	4 +

CHART XII

TITRATION OF ANTIGEN PREPARED FROM CANNED SAUSAGE INOCULATED WITH B. BOTULINUS TYPE B

SERUM USED	DEGREE OF COMPLEMENT-FIXATION WITH GRADUATED AMOUNTS OF ANTIGEN									CONTROLS		
	.80 c.c.	.60 c.c.	.40 c.c.	.30 c.c.	.25 c.c.	.20 c.c.	.15 c.c.	.10 c.c.	.05 c.c.	— S	Ant.	Comp.
Normal Horse Serum (.15 c.c. in each tube)	±	±	—	—	—	—	—	—	—	—	±	4 +
Antitoxic Horse Serum Type B (.15 c.c. in each tube)	4 +	4 +	4 +	4 +	4 +	4 +	2 +	2 +	±	+ S	H. S.	Ambo.
										—	—	4 +

culture, are shown in Charts IX and X. A titration of antigen representing the fluid from canned corn inoculated with B. botulinus type A is depicted in Chart XI. Chart XII shows the results obtained with infected sausage.

In Chart VII it will be noted that in the presence of botulinus antitoxin partial fixation of complement resulted with .05, .10, .15 and .20 c.c. respectively of the asparagus antigen. In the tubes containing .25 c.c. and over of antigen, fixation of complement was perfect with no trace of hemolysis. In the corresponding tubes with negative serum complete hemolysis occurred in all instances. The controls in all instances responded properly.

In Chart VIII it will be seen that the type B asparagus antigen gave partial fixation of complement in .05, .10, and .15 c.c. amounts respectively, complete fixation occurring with .20 c.c. and over. With the negative serum hemolysis was complete in all tubes. The controls were satisfactory.

Chart IX shows the fluid from canned string beans inoculated with a type B culture to be slightly antigenic in .10 c.c. amounts, increasing to perfect fixation of complement with .25 c.c., such reactions continuing with the larger quantities. In the presence of negative serum corresponding amounts of this antigen did not inhibit hemolysis.

Chart X demonstrates the results obtained with fluid from inoculated spinach which was weak as an antigen. No demonstrable fixation of complement occurred in the tubes containing respectively .05, .10, and .15 c.c. of antigen. Slight fixation occurred with .20 c.c., whereas .25 and .30 c.c. resulted in the fixation of approximately 75 per cent of the complement. Perfect fixation occurred with .40, .60 and .80 c.c. respectively. Corresponding amounts of antigen with the negative serum did not interfere with hemolysis. The controls in this titration all showed proper reactions.

Chart XI indicates the reaction obtained with an antigen prepared from canned corn inoculated with B. botulinus type A. No fixation of complement was demonstrated in the tubes containing .05 and .10 c.c. of the antigen. Partial fixation was noted with .15 and .20 c.c. With .25 c.c. and over, perfect fixation of complement occurred. With the negative serum hemolysis was complete in all tubes with the exception of the one containing .80 c.c. of antigen. In this tube hemolysis of the red blood cells was slightly inhibited. The controls responded satisfactorily. A slight degree of inhibition occurred in the antigen control which contained the maximum amount of antigen used in the titration (.80 c.c.).

In Chart XII the results obtained with an antigen prepared from inoculated canned sausage are depicted. Partial fixation of complement occurred in the tube containing .05 c.c. of antigen. .20 c.c. and over resulted in complete fixation. This antigen was slightly inhibitory in .60 and .80 c.c. amounts in the presence

of negative serum. Complete hemolysis occurred in all other tubes with negative serum. Slight inhibition of hemolysis occurred in the antigen control containing .80 c.c. of the antigen.

CONCENTRATED ANTIGENS

As the antigenic value of some of the preparations used in the various titration tests for the identification of B. botulinus and its toxin was occasionally less than with others, experiments were conducted to determine whether or not concentration could be accomplished.

Several 50 c.c. specimens of lots of antigens prepared from canned foodstuffs as previously described, were placed in large Petri plates and desiccated in vacuum over sulphuric acid in a Scheibler desiccator. This dried material was then taken up in 10 c.c. of physiological salt solution and subjected to the usual titration test. The results obtained indicated that the fluid from canned goods lightly infected with B. botulinus and its toxin can be concentrated for the titration test.

Because of the time required to dry the fluid as above described it was determined to try evaporating the fluid by heat. Accordingly, specimens consisting of 50 c.c. of the fluid were put in porcelain casseroles, placed on a water bath and evaporated almost to a dryness. This process required only about one hour. The specimens were then taken up in 10 c.c. of physiological salt solution and were titrated. Excellent results were obtained.

Charts XIII and XIV illustrate the results obtained with fluid from inoculated asparagus and spinach, concentrated by heat evaporation as above described.

The concentrated asparagus fluid used in the titration outlined in Chart XIII was prepared from the lot used in the titration test recorded as Chart VII. .05 c.c. of the concentrated antigen resulted in approximately 50 per cent fixation of complement, perfect fixation occurring with .10 c.c. and over. Reference to Chart VII will show that with this same antigen unconcentrated .05 and

CHART XIII

TITRATION OF CONCENTRATED FLUID FROM INOCULATED ASPARAGUS AS B. BOTULINUS ANTIGEN
(Inoculated with Type A Culture)

Serum Used	Degree of Complement-Fixation with Graduated Amounts of the Fluid									Controls		
	.80 c.c.	.60 c.c.	.40 c.c.	.30 c.c.	.25 c.c.	.20 c.c.	.15 c.c.	.10 c.c.	.05 c.c.	— S	Ant.	Comp.
Normal Horse Serum (.15 c.c. in each tube)	—	—	—	—	—	—	—	—	—	—	—	4 +
Antitoxic Horse Serum Type A (.15 c.c. in each tube)	4 +	4 +	4 +	4 +	4 +	4 +	4 +	4 +	2 +	+ S	H. S.	Ambo.
										—	—	4 +

CHART XIV

TITRATION OF CONCENTRATED FLUID FROM INOCULATED SPINACH AS B. BOTULINUS ANTIGEN
(Inoculated with Type B Culture)

Serum Used	Degree of Complement-Fixation with Graduated Amounts of the Fluid									Controls		
	.80 c.c.	.60 c.c.	.40 c.c.	.30 c.c.	.25 c.c.	.20 c.c.	.15 c.c.	.10 c.c.	.05 c.c.	— S	Ant.	Comp.
Normal Horse Serum (.15 c.c. in each tube)	—	—	—	—	—	—	—	—	—	—	—	4 +
Antitoxic Horse Serum Type B (.15 c.c. in each tube)	4 +	4 +	4 +	4 +	4 +	4 +	2 +	±	—	+ S	H. S.	Ambo.
										—	—	4 +

.10 c.c. resulted in less than 25 per cent fixation of complement, while .15 and .20 c.c. gave respectively about 25 and 50 per cent fixation. It required .25 c.c. or more to produce perfect fixation. This concentrated antigen in the presence of the negative serum did not inhibit hemolysis in any instance.

Chart XIV shows the results obtained with an antigen prepared by concentrating the spinach fluid used in the titration shown in Chart X. With this concentrated material slight fixation of complement was noted in the tube containing .10 c.c. In the tube containing .15 c.c. approximately 50 per cent of the complement was "fixed." Perfect fixation occurred with .20 c.c. and over. Complete hemolysis resulted in all tubes containing the antigen in the presence of negative serum. This same antigen, undiluted, caused slight fixation of complement in .20 c.c., approximately 75 per cent fixation in .25 and .30 c.c., and perfect fixation where .40 c.c. and above were employed.

SUMMARY AND CONCLUSIONS

Culture of B. botulinus, either in a pure or contaminated state, can be identified by means of complement-fixation titrations. In the pure state, autoclaved broth cultures diluted with physiological salt solution were used in the titrations with very satisfactory results. With mixed cultures, Berkefeld filtrates gave excellent results. A concentrated, stable antigen can be prepared from washed spores killed by autoclaving, where it is desired to keep on hand B. botulinus antigen for the testing of positive serum and for control purposes.

The fluid from various canned vegetables and sausage artificially inoculated with B. botulinus, was utilized as antigen in complement-fixation titration tests for the detection of the organism and its toxin in such canned foodstuffs. Concentration of such fluids, low in antigenic properties, was accomplished by desiccation in vacuum over sulphuric acid and by evaporation on a water bath. In the practical application of the test, it is probably advisable, as a routine procedure, to concentrate the fluids.

The results obtained in this work point to the fact that, in laboratories where facilities exist for conducting the complement-fixation test, such method can be used to distinct advantage in identifying B. botulinus and its toxin in culture and in canned foodstuffs.

REFERENCE

1. Dubovsky and Meyer. Jr. of Infectious Diseases, Vol. 31, No. 6, December, 1922.

□

Gas Production by an Aerobic Spore-Bearing Bacillus.—Reports a number of instances of the isolation of a lactose fermenting spore bearing aerobic organism, B. asterosporus. The agreement of characteristics as described by various investigators is pointed out and a summary of the morphological and cultural characteristics as reported by McCoy of Florida is given. The writer concludes that while there are a few points of difference to be noted, the general resemblance warrants the possibility that all of the aerobic spore bearing lactose fermenting organisms so far studied have been cultures of B. asterosporus.—Henrietta Lisk, *Jr., Am. Water Works Assoc.*, 1, 139, 1923.

Bacteriostasis with Mixed Dyes.—The author mixes gentian violet and neutral acraflavine which has a reverse selective bacteriostatic power, thus fortifying the weakness of each of these dyes with the strength of the other. If a mixed bacterial emulsion containing B. pyocyaneus and B. anthracis be exposed to gentian violet and streaked on agar a pure culture of B. pyocyaneus will result. If the same mixed emulsion be exposed to neutral acraflavine, a pure culture B. anthracis results. If the emulsion be exposed to mixture 1 and 2 dyes, neither organism grows—establishing the principle of supplementary selective bacteriostasis by means of mixture.—John Churchman, New York, *Proc. Soc. Exp. Biol. and Med.*, 20, 16, 1922.

DECLINE IN INFANT MORTALITY IN THE UNITED STATES BIRTH-REGISTRATION AREA, 1915 TO 1921*

ROBERT MORSE WOODBURY, PH.D.

Director of Statistical Research, Children's Bureau, U. S. Department of Labor

THE infant mortality rate in the expanding birth-registration area of the United States fell from 99.9 in 1915 to 75.6 in 1921, according to statistics published by the Bureau of the Census.[1] This represents a decrease of 24 per cent in the six-year period.

By the admission of new states to the birth-registration area, the proportion of the population of the country included within it increased from 31 per cent in 1915 to more than twice as large a proportion, 65.3 per cent, in 1921. The decrease in the infant mortality rate is therefore the resultant of two elements—the improvement in the conditions affecting mortality, and the admission to the registration area of states in which the infant mortality rates were different from that in the original area. Table I shows the relation between the rates in the original and in the added areas.[2] In 1916 Maryland, the only state added to the area in that year, had a rate, 121, considerably above that of the original area for the same year, 100; with this exception, each of the annual additions of territory had an infant mortality rate lower than that of the area to which it was added. A part of the apparent decrease in the infant mortality rate in the expanding birth-registration area must, therefore, be ascribed to the addition to the area of states in which infant mortality rates were low.

To find a measure of the true fall in the infant mortality rate in the area during the period 1915–1921 as distinguished from the decrease in the rates that is influenced by the low rates in the territory admitted, two methods are available. The first and simpler is to study the decrease in infant mortality in the original area (exclusive of Rhode Island). In this area the rate fell from 99.6 to 78.7, a decrease of 20.9 per cent as compared with the decrease of 24.3 per cent, from 99.9 to 75.6, in the rate for the expanding area. Thus only about one-seventh of the decrease in the rate is accounted for by the inclusion of new territory.

This method, however, does not take into account the decrease in rates in the territories added to the original registration area.

The tendency toward a fall in infant mortality rates appears, as shown in Table I, not only in the original birth-registration area but also in each addition to the area. While in the original birth-registration area (exclusive of Rhode Island), as already stated, the rate fell 20.9 per cent during the period 1915 to 1921, in Rhode Island the percentage of decrease was slightly larger, 22.9. During the period from 1916 to 1921 the rate in Maryland, which was added in 1916, fell 22.6 per cent; during the period from 1917 to 1921 in the nine states added in 1917 the rate fell 19.1 per cent. Decreases of 12.4 per cent and 8.7 per cent appeared in the rates for the areas added in 1919 and 1920 during the periods from the time of their admission to 1921.[3]

* Grateful acknowledgment is made of the courtesy of the Bureau of the Census in furnishing in advance of publication data upon which the paper is based.

1. Figures compiled from Birth Statistics, 1915, p. 10, and Infant Mortality in the Birth-Registration Area of the United States, 1921. U. S. Bureau of the Census.

2. Rhode Island, though included in the original birth-registration area in 1915, is treated as separate from it in this discussion, since for the two years 1919 and 1920 the state was droped from the birth-registration area altogether.

3. It should be noted that with a given rate of decrease the percentage decrease over a period of time varies with the length of the period.

TABLE I. INFANT MORTALITY RATES IN EXPANDING BIRTH-REGISTRATION AREA, 1915 TO 1921.[1]

AREA	1915	1916	1917	1918	1919	1920	1921
Expanding birth-registration area	99.9	101.0	93.8	100.8	86.6	85.8	75.6
Original area[2] (excluding Rhode Island)	99.6	100.0	96.1	105.8	88.7	89.9	78.7
Rhode Island	120.3	111.2	107.5	125.6	[3]	[3]	92.7
State added in 1916[4]		121.0	119.9	140.4	105.4	104.1	93.6
States added in 1917[5]			88.1	90.4	82.4	79.4	71.3
States added in 1919[6]					86.2	88.2	75.5
State added in 1920[7]						64.2	58.6
States added in 1921[8]							73.0

[1] Compiled from Birth Statistics, 1915–1920, and Infant Mortality in the Birth-Registration Area of the United States: 1921. U. S. Bureau of the Census.
[2] Maine, New Hampshire, Vermont, Massachusetts, Connecticut, New York, Pennsylvania, Michigan, Minnesota, District of Columbia.
[3] Dropped from birth-registration area.
[4] Maryland.
[5] Virginia, North Carolina, Ohio, Indiana, Kentucky, Wisconsin, Kansas, Utah, Washington.
[6] South Carolina, Oregon, California.
[7] Nebraska.
[8] New Jersey, Delaware, Mississippi.

A method taking into account the decrease in mortality rates within the added territory as well as within the original territory—giving to each fall in rate its due weight in the calculation—is as follows. The percentage of decrease from each year to the next in the territory common to both years is first ascertained. The initial rate in 1915 is then multiplied by the percentage of decrease from 1915 to 1916 in the territory common to both years; the result is multiplied by the percentage of decrease from 1916 to 1917 in the territory common to these years; and the successive results are multiplied by the corresponding percentages of decrease to form a series of adjusted figures which measure the true fall in the infant mortality rates of the birth-registration area. The series so constructed is as follows, starting with the initial rate of 99.9 (for the original birth-registration area, including Rhode Island): 99.9, 100.2, 96.4, 103.8, 89.4, 89.0, and 78.5. It will be seen by comparing this series with the series of rates in the original birth-registration area that the tendency to decrease is substantially the same in the original area and in the added territory.

The following discussion is limited to the changes in the rates of infant mortality in the original birth-registration area exclusive of Rhode Island.

The changes in the mortality rates for the important causes of death under one year of age are given in detail in Table II, which shows the rates in each of the years from 1915 to 1921 and the percentage changes in the rates during the period. In 1921 a revised list of causes of death was used, but the changes made in the revision do not affect the comparability of the broad groups of causes nor, with one or two exceptions, do they affect the individual causes.[4]

The mortality rate from gastric and intestinal diseases fell from 24.58 in 1915 to 16.08 in 1921, a decrease of over one-third, or 34.6 per cent. This decrease, it may be noted, was continuous throughout the period, except for a slight increase from 1915 to 1916. The tendency to a progressive decline suggests that the decrease is largely due to a permanent improvement in health conditions rather than to unusually favorable summer temperatures and weather of a single year.

4. The changes in 1921 affecting the causes listed in Table II are as follows: Deaths from duodenal ulcer, formerly classified with diarrhea and enteritis, were included with diseases of the stomach (this change affects very few deaths under one year); deaths from capillary bronchitis, formerly included with acute bronchitis, were classified with broncho-pneumonia; deaths from the joint causes, influenza and lobar pneumonia, formerly classed with pneumonia, were included with influenza; deaths from acute miliary tuberculosis, formerly included under tuberculosis of the lungs (title 13 of the abridged list), were divided, deaths from acute miliary tuberculosis of lungs were included with the new title "tuberculosis of the respiratory system" and deaths from all other miliary tuberculosis were included with other forms of tuberculosis. Other changes were made, chiefly in nomenclature, such as tuberculosis of the meninges and central nervous system for tuberculous meningitis; meningococcus meningitis, formerly subdivision 3, cerebrospinal fever, under meningitis, now shown separately and classed with epidemic diseases, diphtheria for diphtheria and croup, etc. With the exceptions noted, the rates shown in the tables are comparable.

TABLE II. DECLINE IN INFANT MORTALITY RATES, BY CAUSE OF DEATH, 1915 TO 1921; U. S. BIRTH-REGISTRATION AREA AS OF 1915 (EXCLUSIVE OF RHODE ISLAND).[1]

CAUSE OF DEATH[2]	INFANT MORTALITY RATE							PER CENT DECREASE 1915-1921[3]
	1915	1916	1917	1918	1919	1920	1921	
All causes	99.55	99.95	96.08	105.83	88.74	89.92	78.67	21.0
Gastric and intestinal diseases	24.58	25.05	23.38	23.18	18.97	18.69	16.08	34.6
Diseases of the stomach	1.45	1.40	1.07	1.33	1.21	1.05	0.84	41.8
Diarrhea and enteritis	23.13	23.66	22.31	21.85	17.76	17.64	15.23	34.1
Respiratory diseases	16.57	15.82	16.44	18.41	14.49	14.95	11.23	32.2
Acute bronchitis	2.58	2.52	2.66	2.58	2.29	2.31	1.37	46.9
Bronchopneumonia	9.86	9.40	9.38	10.67	9.08	9.48	7.46	24.3
Pneumonia	4.13	3.90	4.40	5.16	3.13	3.16	2.40	41.9
Malformations	6.44	6.85	6.68	6.95	6.94	7.05	7.08	[4]10.0
Early infancy	34.35	33.29	32.40	34.13	31.60	31.54	30.63	10.8
Premature birth	18.53	19.23	19.18	20.65	18.95	19.03	18.21	1.7
Congenital debility	11.69	9.92	8.83	9.64	8.52	7.96	7.35	37.1
Injuries at birth	4.13	4.14	4.39	3.84	4.13	4.55	5.07	[4]22.7
Other communicable diseases	7.62	8.92	7.95	14.66	8.55	9.48	5.97	21.7
Measles	0.72	1.44	0.93	1.09	0.58	1.23	0.54	24.7
Scarlet fever	0.10	0.05	0.07	0.04	0.05	0.11	0.14	[4]40.6
Whooping cough	1.93	2.21	1.99	2.95	1.31	2.77	1.83	5.2
Diphtheria	0.58	0.52	0.52	0.45	0.49	0.49	0.45	22.5
Influenza	0.62	0.86	0.74	6.76	3.07	2.13	0.56	9.2
Dysentery	0.22	0.19	0.16	0.21	0.15	0.15	0.13	40.6
Erysipelas	0.55	0.58	0.57	0.49	0.47	0.49	0.43	21.4
Tetanus	0.08	0.09	0.07	0.06	0.06	0.04	0.05	36.8
Tuberculosis of the respiratory system	0.49	0.54	0.56	0.49	0.46	0.39	0.27	44.9
Tuberculosis of the meninges, etc.	0.81	0.83	0.83	0.78	0.65	0.57	0.53	35.6
Other forms of tuberculosis	0.26	0.25	0.23	0.24	0.19	0.17	0.19	26.9
Syphilis	1.26	1.34	1.28	1.10	1.06	0.93	0.84	32.9
External causes	1.01	1.06	1.27	0.99	0.88	0.86	0.80	20.2
Diseases ill-defined and unknown	0.69	0.81	0.78	0.85	0.80	0.69	—[5]	—[5]
All other causes	8.30	8.15	7.18	6.67	6.51	6.65	6.87	23.5
Meningitis	0.87	0.76	0.83	0.76	0.65	0.59	0.62	28.9
Convulsions	1.57	1.24	1.03	1.16	1.06	0.97	0.80	48.6
Diseases of the heart	0.40	0.34	0.36	0.36	0.37	0.35	0.25	36.5
Other	5.46	5.81	4.96	4.40	4.43	4.73	[6]5.20	[6]15.5

[1] Compiled from Birth Statistics, 1915 to 1920; Mortality Statistics, 1915 to 1920; and manuscript figures for 1921 furnished in advance of publication by courtesy of the Bureau of the Census.

[2] In this table only those diseases most important during infancy are shown separately. Except for the group of all other causes, each group includes only the specific diseases which are shown separately. The numbers of the International List included in the various groups are (the numbers of the old list in parentheses): Gastric and intestinal diseases, 111-113 (102-104); respiratory diseases, 99-101 (89, 91, 92); malformations 159 (150); early infancy 160-163 (151-153); other communicable diseases, 7-11, 16, 21, 29, 31-38 (6-10, 14, 18, 24-35, 37); external causes, 175-203 (155-186); diseases ill-defined and unknown, 204-205 (187-189); the remaining numbers are included with all other (—).

See note 4, p. 378, for effect of changes in classification upon the comparability of the rates in 1921 with the rates for the preceding years, 1915-1920.

[3] The percentages were calculated from rates carried to three places.

[4] Per cent of increase.

[5] Figures not available at time of preparation of this paper.

[6] Includes ill-defined and unknown.

The rate from respiratory diseases fell from 16.57 in 1915 to 11.23 in 1921, a decrease of nearly one-third, or 32.2 per cent. The rise of the rate in 1918 probably shows the effect of the influenza epidemic; since, as already noted, deaths ascribed jointly to lobar pneumonia and influenza were at that time classified as pneumonia and the deaths due to these joint causes would be likely to increase during the influenza epidemic. Bronchopneumonia also showed an increase in 1918, probably due to the same cause. Although the general tendency of the rates from respiratory diseases is downward, it may be pointed out that, leaving the year 1918 out of consideration, the percentage decrease from 1920 to 1921 was greater than that from any other year of the period to the next.

The death rate from malformations shows a slight increase from 6.44 in 1915 to 7.08 in 1921.

The mortality rate from causes peculiar to early infancy decreased from 34.35 in 1915 to 30.63 in 1921, a decrease of one-tenth, or 10.8 per cent. In this case also, the fall in the rate was a regular decrease from year to year, with the exception of 1918, when influenza may have increased the mortality from these causes as it increased the mortality of pregnant women. Of the three causes which are included in this group, premature birth showed com-

paratively little change, though the rate of 18.21 in 1921 was lower than any other in the seven-year period, and injuries at birth showed a tendency, especially in 1920 and in 1921, to increase: practically all the decrease in the group was in deaths from congenital debility. The death rate from this cause fell from 11.69 in 1915 to only 7.35 in 1921, a decrease of 37.1 per cent.[5] The decrease in deaths from congenital debility may perhaps reflect an increased accuracy in the certification of cause of death, or may be attributable to a decrease in the death rate from such causes as malnutrition, marasmus, wasting, weakness, and emaciation, which are ascribed to this rubric if they are given as causes of death for infants under one year of age.

The mortality rate from "other communicable diseases," a group which includes the epidemic diseases and tetanus, tuberculosis and syphilis, fell from 7.62 in 1915 to 5.97 in 1921, a decrease of one-fifth, or 21.7 per cent. As would be expected, the rates from this group of causes exhibit marked fluctuations from year to year. The high rate of 14.66 in 1918 shows the effect of the influenza epidemic. The rates from some of the individual causes show characteristic trends or fluctuations. Measles appears to have a two-year cycle of fluctuation, the rate being high and low in alternate years; but the rate for 1921 was lower than any other of the seven-year period. Scarlet fever, on the other hand, had in 1921 a rate higher than any other of the seven-year period. Whooping cough, like measles, seems to have high and low rates in alternate years, and the rate in 1921 was the lowest except for that in 1919. The 1921 rate from diphtheria was equal to that of 1918; these were the lowest of the period and were one-fifth lower than the rate for 1915. The rate from influenza increased from 0.62 in 1915 to 6.76 in 1918, and fell off slowly to 3.07 in 1919 and to 2.13 in 1920; in 1921 it fell to 0.56, a rate lower even than that for 1915. The rates from dysentery, erysipelas and tetanus all show a tendency to fall. The mortality from tuberculosis (all forms) fell from 1.56 in 1915 to 0.99 in 1921, a decrease of over one-third. Syphilis showed a decrease of nearly one-third in the period under review. Though not shown separately in the table, it may be noted that the death rate from cerebrospinal fever increased from 0.13 in 1915 to 0.32 in 1917, from which it fell in 1921 to 0.16. With one or two exceptions, then, the mortality rates from these epidemic and communicable diseases decreased markedly during the period from 1915 to 1921.

The death rate from external causes fell from 1.01 in 1915 to .80 in 1921, a decrease of one-fifth. The death rate from all other causes, including the ill-defined and unknown, fell from 8.90 in 1915 to 6.87 in 1921, or 23.5 per cent. Among the causes included in this group convulsions showed a decrease of nearly one-half, 48.6 per cent, and diseases of the heart a decrease of over one-third, 36.5 per cent.

A comparison of the mortality rates from the several causes of death in urban and rural areas is of especial interest. The decrease in the mortality rate from 1915 to 1921 in urban areas, that is, in cities of 10,000 population and over,[6] was

5. Further analysis of the deaths from "congenital debility" of the abridged list into the two groups of which it is composed, "congenital debility proper" (151 (2) of the old list) and "other causes peculiar to early infancy" (152 (2) and 153 of the old list) shows that the reductions occurred mainly in the death rate from congenital debility proper. The rate from this cause fell from 8.53 in 1915 to 4.3 in 1921, while the rate from "other causes peculiar to early infancy" fell only from 3.16 in 1915 to 3.06 in 1921.

6. In the urban area were included cities which at the last preceding census had at least 10,000 population. Three cities which were included in the urban areas in 1915 were transferred to the rural in 1921 because their populations had fallen to less than 10,000 each; their infant mortality rates in 1915 averaged 86.2, or somewhat less than the average for urban districts. On the other hand, 54 cities that were not included in the urban areas in 1915 were added to them in 1921, on account of an increase of their populations past the 10,000 mark. The infant mortality rate in these cities in 1921 was 77.43, or slightly less than the rate for the urban areas. (Table III.) For the areas classified as urban both in 1915 and in 1921 the percentage of decrease was 24.1, and for the areas classified as rural in both years it was 15.9. The percentage decrease for the urban areas was actually slightly better, as compared with the rural, than the table indicates.

TABLE III.—DECLINE IN INFANT MORTALITY RATES, FOR URBAN AND RURAL DISTRICTS, BY CAUSE OF DEATH, 1915 to 1921; UNITED STATES BIRTH-REGISTRATION AREA AS OF 1915 (EXCLUSIVE OF RHODE ISLAND) [1]

CAUSE OF DEATH[2]	URBAN			RURAL		
	Infant mortality rate		Per cent decrease, 1915 to 1921[3]	Infant mortality rate		Per cent decrease, 1915 to 1921[3]
	1915	1921		1915	1921	
All causes	102.94	78.24	24.0	94.11	79.43	15.6
Gastric and intestinal diseases	26.57	15.73	40.8	21.37	16.69	21.9
Diseases of the stomach	1.03	0.60	42.1	2.12	1.28	39.4
Diarrhea and enteritis	25.54	15.13	40.7	19.25	15.41	20.0
Respiratory diseases	17.70	11.50	35.1	14.75	10.77	27.0
Acute bronchitis	2.71	1.39	48.6	2.38	1.34	43.8
Bronchopneumonia	11.08	7.83	29.4	7.88	6.81	13.6
Pneumonia	3.91	2.28	41.8	4.48	2.62	41.7
Malformations	6.17	6.77	[4] 9.8	6.87	7.63	[4] 11.2
Early infancy	34.81	31.08	10.7	33.63	29.83	11.3
Premature birth	18.63	18.32	1.7	18.36	18.01	1.9
Congenital debility	11.75	7.15	39.1	11.59	7.71	33.5
Injuries at birth	4.42	5.61	[4] 26.8	3.67	4.12	[4] 12.3
Other communicable diseases	8.38	5.98	28.6	6.39	5.94	7.2
Measles	0.90	0.48	47.1	0.42	0.65	[4] 55.1
Scarlet fever	0.10	0.15	[4] 47.0	0.10	0.13	[4] 29.1
Whooping cough	1.83	1.65	10.1	2.10	2.17	[4] 3.3
Diphtheria	0.70	0.53	25.0	0.38	0.31	18.9
Influenza	0.40	0.42	[4] 4.0	0.97	0.82	15.5
Dysentery	0.22	0.09	57.6	0.22	0.20	11.3
Erysipelas	0.67	0.49	26.6	0.36	0.33	9.2
Tetanus	0.07	0.04	44.6	0.08	0.06	24.1
Tuberculosis of the respiratory system	0.55	0.29	46.4	0.40	0.23	43.0
Tuberculosis of the meninges, etc.	1.03	0.61	40.4	0.48	0.37	21.8
Other forms of tuberculosis	0.26	0.21	20.5	0.26	0.16	38.8
Syphilis	1.65	1.03	37.6	0.63	0.51	18.2
External causes	0.98	0.74	25.1	1.04	0.92	11.5
All other causes	9.52	6.44	32.4	10.63	7.65	28.1
Convulsions	1.25	0.58	53.9	2.08	1.21	41.7
Diseases of the heart	0.34	0.17	48.5	0.50	0.40	20.5
Other[5]	7.72	5.69	26.3	8.64	6.03	30.2

[1] Source, manuscript figures furnished by courtesy of the United States Bureau of the Census.
[2] See note 4, page 378, for effect of changes in classification upon the comparability of the rates for the several causes in the two years. See also Note 2, Table II.
[3] The percentages were calculated from rates carried to three places.
[4] Per cent increase.
[5] Includes diseases ill-defined and unknown and meningitis.

both actually and relatively greater than the decrease in rural districts—24 per cent as compared with only 15.6 per cent (Table III). In 1915 the rate for cities was nearly 9 points higher than that for rural areas; in 1921 it was 1 point below the rural rate.

The analysis by cause of death shows a similar change in the ratio between the rates from gastric and intestinal diseases in urban and in rural areas. In 1915 the rate for the cities was slightly over 5 points, or nearly 24.3 per cent, higher than the rate for the rural areas, but in 1921 the urban rate was nearly 1 point, or 5.8 per cent, lower than the rural rate. The progress of infant-welfare work in the cities and continued progress in the efficient regulation and supervision of the production, transportation, and distribution of milk, are doubtless responsible for this shift in the relative position of urban and rural rates from gastric and intestinal diseases. This change is all the more noteworthy in view of the handicaps which the cities have had to overcome in order to insure a pure milk supply, and in view also of the probability that a larger proportion of infants are artificially fed in the urban than in the rural areas.[7]

7. Studies made by the Children's Bureau in selected rural areas and cities indicate a larger proportion of infants artificially fed in the cities. Thus, of infants surviving at the end of the third month the proportion artificially fed was 6.1 per cent in a rural county in Kansas and 9.4 per cent and 11.3 per cent in rural districts in two counties in Wisconsin, as compared with percentages of 15.5, 16.1, 19.2, 24.7, 28.8, and 30.6 in Akron, Ohio; Saginaw, Mich.; Waterbury, Conn.; New Bedford, Mass.; Manchester, N. H.; and Brockton, Mass., respectively. See Maternity and Infant Care in Two Rural Counties in Wisconsin, by Dr. Florence Brown Sherbon and Elizabeth Moore, p. 92, U. S. Children's Bureau Publication No. 46; Maternity and Infant Care in a Rural County in

TABLE IV.—DECLINE IN INFANT MORTALITY RATES AT DIFFERENT AGES UNDER 1 YEAR, IN URBAN AND RURAL AREAS, 1915 TO 1921; UNITED STATES BIRTH-REGISTRATION AREA (EXCLUSIVE OF RHODE ISLAND) AS OF 1915.

AGE AT DEATH	DEATHS PER 1,000 LIVE BIRTHS					
	Area		Urban		Rural	
	1915	1921	1915	1921	1915	1921
Total	99.55	78.67	102.94	78.24	94.11	79.43
Under 1 month	44.33	40.80	43.30	40.15	45.99	41.96
Under 1 week	30.11	29.32	29.55	29.28	31.03	29.39
Under 1 day	15.03	14.64	14.68	14.58	15.60	14.74
1 day, under 2	4.84	4.61	4.76	4.57	4.96	4.67
2 days, under 3	3.49	3.59	3.50	3.73	3.49	3.35
3 days, under 1 week	6.75	6.48	6.61	6.40	6.97	6.63
1 week, under 2	5.99	5.03	5.77	4.78	6.34	5.47
2 weeks, under 3	4.56	3.65	4.41	3.45	4.80	4.00
3 weeks, under 1 month	3.67	2.80	3.57	2.63	3.83	3.11
1 month, under 2	9.01	6.53	9.14	6.32	8.80	6.90
2 months, under 3	7.55	5.17	7.72	4.89	7.27	5.69
3 months, under 6	16.80	11.59	17.99	11.50	14.87	11.76
6 months, under 9	12.46	8.30	13.90	8.62	10.13	7.73
9 months, under 12	9.41	6.28	10.89	6.76	7.04	5.42

The mortality from respiratory diseases was higher in the cities than in the rural areas both in 1915 and in 1921, although the percentage of decrease in the rate was greater for the cities.

In both urban and rural areas, the rate of mortality from malformations increased. The rates in the cities were less than those in the rural districts in both years and showed a somewhat smaller increase during the seven-year period. The death rate from injuries at birth likewise showed an increase in both urban and rural districts; in this case the increase was greater for the urban than for the rural areas. The mortality from premature birth showed little change, while on the other hand the mortality from congenital debility showed marked decreases in the areas of both types, the percentage of decrease being greater in the cities.

It is interesting to note that for most of the epidemic and other communicable diseases, notably diphtheria, erysipelas, tuberculosis, and syphilis, the rates were higher in cities than in rural areas. On the other hand, whooping cough appeared to be more prevalent in the rural areas.

The decreases in the infant mortality rates from the several causes noted are reflected in decreases in the death rates at each of several different ages under one year, as shown in Table IV. Of especial interest is the marked decrease in the mortality rate for the first month of life from 44.33 in 1915 to 40.8 in 1921, and the fact that the decrease was greater in the rural than in the urban areas. The urban rate of neonatal mortality was lower than the rural rate in both years. Comparing the urban and rural rates in 1915, it appears that the urban rates exceeded the rural for each age except the first month of life; in 1921, however, the urban rates exceeded the rural only for the last six months of the first year of life.[8]

Kansas, by Elizabeth Moore, p. 42, U. S. Children's Bureau Publication No. 26; Infant Mortality: Results of a Field Study in Saginaw, Mich., Based on Births in One Year, by Nila F. Allen, p. 21, U. S. Children's Bureau Publication No. 52; Infant Mortality: Results of a Field Study in Waterbury, Conn., Based on Births in One Year, by Estelle B. Hunter, p. 132, U. S. Children's Bureau Publication No. 29; and Infant Mortality: Results of a Field Study in Brockton, Mass., Based on Births in One Year, by Mary V. Dempsey, p. 22, U. S. Children's Bureau Publication No. 37.

8. These conclusions depend in part upon assumptions relative to the completeness of birth registration. If birth registration improved during the period, the decreases in the rates are overstated and the increases understated in proportion to the extent to which birth registration improved; for many of the causes of death, however, the decreases were so great that it is highly improbable that they can be accounted for by any change in completeness of birth registration. It is probable that birth registration improved more in rural than in urban areas, and consequently that the decrease in mortality rates for urban areas is understated as compared with that in rates for rural areas.

TABLE V.—COMPARATIVE INFANT MORTALITY RATES, BY CAUSE OF DEATH, UNITED STATES BIRTH-REGISTRATION AREA AS OF 1915, EXCLUSIVE OF RHODE ISLAND, AND NEW ZEALAND: 1921.[1]

CAUSE OF DEATH	INFANT MORTALITY RATES, 1921	
	U. S. birth-registration area [2]	New Zealand
All causes	78.67	47.82
Gastric and intestinal diseases	16.08	4.13
Respiratory diseases	11.23	4.80
Malformations	7.08	5.01
Early infancy	30.63	26.22
Other communicable diseases	5.97	2.21
External causes	0.80	0.39
All other causes	6.87	5.08

[1] Compiled from manuscript figures furnished by courtesy of the United States Bureau of the Census, and Report on the Vital Statistics of the Dominion of New Zealand for the year 1921, pp. 1, 24-33. The deaths in New Zealand are classified according to the International List of Causes of Death in use during the period 1911-1920. For the specific causes included in each group see Note 2, Table II.

[2] As of 1915, exclusive of Rhode Island.

Causes of the decrease in infant mortality in the United States birth-registration area during the period from 1915 to 1921 are to be found in the movement for the protection of the health of infants and, doubtless, in the movement for general public-health protection and sanitation. The growth within the past few years of public interest in infant-welfare work, in child-health work, and (recently) in prenatal work for expectant mothers has been noteworthy. The distribution of health-instruction pamphlets to mothers by city, state, and federal agencies has assumed more and more comprehensive proportions. The establishment of child-hygiene divisions in 36 states during the period under review (and of 8 more in 1922) is an indication of the awakened interest in the problems of infant and child health. Another factor in this decrease, the importance of which should not be slighted, is the progress of medical science, the improvement of the technical training of physicians, and the increased number of pediatrists. The steady extension of sanitation to benefit larger numbers of the population and the improvement of standards for milk distribution, likewise, should not be overlooked. All these factors doubtless play their parts in the decrease of the infant mortality rate by one-fifth in the short space of six years.

Much, however, remains to be accomplished. Even the low rate of 1921 is by no means to be accepted as a final and satisfactory minimum. Some idea can be formed of possible further reductions in infant mortality by comparing the rates in the birth-registration area in 1921 with those in New Zealand for the same year, as in Table V. In that year the New Zealand rate from gastric and intestinal diseases was about one-fourth, her rate from respiratory diseases less than half, her rate from causes peculiar to early infancy six-sevenths, her rate from "other communicable diseases" three-eighths, of the corresponding rates in the United States birth-registration area as established in 1915, exclusive of Rhode Island. A further reduction of the infant mortality rate of the United States may be expected as a result of the work of state divisions of child hygiene and the establishment of facilities providing prenatal care for mothers. The value of such work has been proved but in many cases it is still in its initial stages. The growth of this prenatal work during the next decade and the steady extension of infant-welfare activities to reach larger and larger numbers of the babies born should be accompanied by a decreasing infant mortality rate.

THE VALUE OF MILK POWDER AGAR IN THE BACTERIOLOGICAL LABORATORY*

HARPER F. ZOLLER

TWO important properties possessed by many bacteria (a) that of forming acid from organic compounds and (b) that of elaborating enzymes which attack complex proteins reducing them to simpler amino forms (proteolysis or peptonization), are readily identified by plating the bacterial dilutions on milk powder agar. Thus we find that the medium, which was originally described by Ayers[1] for the plating of milk and other dairy products, has won for itself a vastly more important field in the general bacteriological laboratory. It finds application in the examination of all food products for bacterial contamination. The ratio of proteolytic to acid formers and to those which show neither property under these conditions can be determined by simply plating the correct dilutions without the laborious plating and fishing method.

This medium lends itself nicely to the detection of proteolytic enzyme production in pure or mixed cultures, and is probably easier to perform than the gelatin liquefaction test. Thirty hours after plating is sufficient time to determine this property. When incubated at 37.5° C. a shorter time is required to show this property than when 30° C. is used. Naturally the optimum growth temperature would be used for the particular organism or group under study.

Some types of bacteria, such as the streptococcus lacticus group, form considerable acid from lactose, and they also produce proteolytic and liquefying enzymes simultaneously with acid production. The enzyme production seems to increase in rate or activity as the acidity develops. Such colonies on the milk powder agar plate exhibit both of these properties.[2] An opaque zone of precipitated casein immediately surrounds the colonies, while a zone of digested protein (water clear) is in contact around the precipitated casein. Certain other bacteria not normally found in milk supplies also show these phenomena.

Our laboratories have experienced such success with this medium, which has been in daily use for the past two years, in the routine examination of milk products, both from the control and research standpoint, that it is thought worth while to interest federal, state and municipal control laboratories in its virtues. While the American Public Health Association has had the original medium, as proposed by Ayers, under observational study for a short period, and has rendered an adverse report on its value, I believe that the medium as it is prepared in these laboratories will overcome all objections which have been raised against its use.

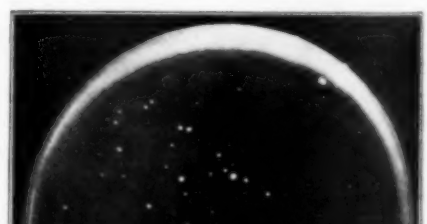

PLATE NO. 1

This is a dilution from an ice cream mix made up from cream, plain skim evaporated and sweetened skim condensed milk. The colonies with the clear area about them are truly proteolytic. The colonies with the white haze in their immediate contact are lactic acid formers, and exhibit no tendency to produce proteolytic enzymes under the conditions of growth. These are the predominating species on the plate along with a few colonies which show neither feature.

* From the Research Department of The Nizer Laboratories Company, Detroit, Michigan.

One of the chief objections raised against Ayers' preparation of milk powder agar is the laborious method required to produce it. This objection may be divided into two main points, (1) the requirement of washed agar, and (2) the difficulty of preventing sedimentation of lime salts and protein. These have been overcome in this laboratory by substituting nutrient agar (Bacto) for the former, and by the addition of a small amount of sodium citrate to take care of the latter.[3] The method devised by the writer for the preparation and use of the modified milk powder agar in these laboratories is given in detail in the following paragraphs.

PREPARATION OF MODIFIED MILK POWDER AGAR

The quantities herein given are for 5 liters of the product.

One hundred and twenty grams of Bacto-Nutrient agar (1 per cent) are weighed and stirred into 4 liters of distilled water. Two grams of pure sodium citrate ($Na_3C_6H_5O_7$) are added and the whole set in streaming steam in the autoclave for about 5 minutes.

Twenty-five grams of skimmed milk powder (any good grade) are stirred in 100 c.c. of distilled water. A thick batter should be made with a small portion of the water at first until all lumps have been removed, then the remainder of the water is added. Stir 6 grams (1.2 grams per liter) of Na_2HPO_4–$2H_2O$ in 30 c.c. of distilled water, and heat to boiling. Add the phosphate solution to the milk powder solution, stir and set into the autoclave and steam for 5 minutes while the agar is being steamed.

Remove the agar and stir it. Also remove the milk-phosphate solution and add another 50 c.c. of distilled water. Replace both the agar and the milk-phosphate solution in the autoclave and heat for 5 minutes at 5 pounds pressure. Filter the milk-phosphate solution (there will be a tough curd at the surface of the opalescent liquid) through a small piece of absorbent cotton placed in the neck of a funnel.

Add 5 grams of lactose to the filtered milk liquid and make up to one liter with distilled water. Now mix this milk powder solution with the hot melted agar and place the hot medium in the flasks or bottles destined to receive it for regular use.

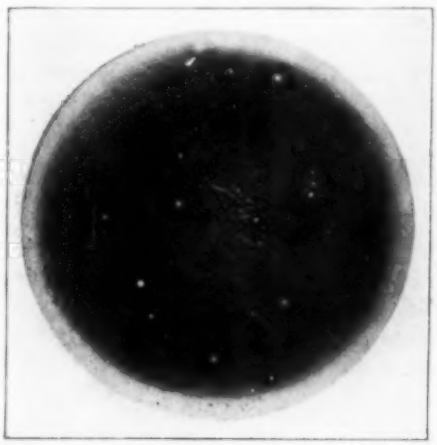

PLATE NO. 2

Plate made from the dilution of a pasteurized 20 per cent cream. The cream had become slightly sour. The large peptonized areas about many of the colonies, which are acid formers, contrast well with the surroundings, and render the identification of the lactic acid streptococci simple. A few true proteolytic colonies are in evidence; also two colonies of yeast.

STERILIZATION

Two methods of sterilization are in use. One is the regular 15 pounds steam pressure (tested steam gauge) for 15 minutes. The other is to use 5 pounds pressure for 10 minutes the first day and 5 pounds pressure for 10 minutes the second day, meanwhile holding at 30° C.

After sterilization there should only be, under the worst of conditions, a very slight sediment at the bottom of the flasks. The function of the sodium citrate[4] is to hold any calcium or magnesium phosphates, which may be present from the agar, in colloidal suspension. Too much citrate makes the medium too clear—it should be very slightly opalescent to show the proteolytic organisms plainly. If made in accordance with the

above method it will always possess the desired opalescence.

Tabulation of the constituents for 5 liters of medium:

PART A

120 grams Bacto-Nutrient Agar
2 grams Sodium citrate
4 liters Distilled water

PART B

25 grams Skimmed milk powder
100 c.c. Distilled water
and
6 grams Na_2HPO_4 $2H_2O$ (Sorensen's)
30 c.c. Distilled water
and
5 grams Lactose
870 c.c. Water

This medium is at a pH of 6.9–7.0 after sterilization. It contains approximately 0.35 per cent lactose, 0.2 per cent milk protein, 1.2 per cent agar, .05 sodium citrate and about 0.8 per cent of protein nutrients in the agar.

PLATING CONDITIONS

30° C. ± 0.5° for 48 hours for milk and most food products.

One can expect an A. P. H. A. agar coefficient with this medium of about 5, although this is an average[2, 3] value and the actual number of colonies will be from 1 to 20 times the number on the A. P. H. A. agar. In choosing the dilutions, therefore, slightly higher dilutions should be made when using this agar. For best results there should be no more than 100 colonies per plate. The presence of a "spreader" is usually deleterious to the qualitative interpretations of the rest of the plate flora because the majority of spreader colonies are proteolytic (perhaps one should say caseolytic in this connection) and thereby reduce the casein in the whole plate to a transparent condition, rendering acid producers obscure.

About 7.5 c.c. of agar is poured per plate.

It seems advisable to increase the lactose content by 0.1 per cent in the final medium. A better recognition of acid formers is obtained thereby.

CONCLUSIONS

The writer has previously shown the relative plate counts on milk powder agar and A. P. H. A. agar (using Bacto-Nutrient Agar) on market milk and ice cream mixes.[2, 3] In every instance the milk powder agar gave a higher total count. It was believed to be due to the presence of the milk substance in the medium. It was pointed out in these papers that a high grade of pasteurized milk showed a predominance in acid forming colonies on the plate; and these colonies usually showed the clear zone of caseolysis outside one zone of casein precipitation, thus confirming Ayers' and Johnson's[4] results on the distribution of bacterial groups in pasteurized milk.

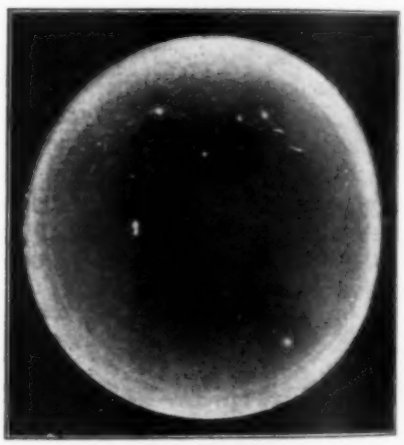

PLATE NO. 3

Plate of a pasteurized market milk. True acid formers are seen on this plate. Owing to irregularities in the petri dish clear definition is lost, but the casein area is visible. Six of the colonies visible on this plate are now acid formers under the conditions of growth.

The presence of many caseolytic colonies on plates from pasteurized milk at once indicates either insufficient pasteurization or improper handling of the milk, or both. The same is practically true for ice cream mixes, except in this case we expect a higher count of both proteolytic and acid forming bacteria, because of the higher fat content (particularly if the ice cream mix be made from cream or whole milk; if made from butter and milk concentrates, homogenized, the bacterial content may be very low).

It is believed that the following features of this medium should recommend it to every well equipped bacteriological laboratory where control or research work is done:

1. The medium is easily prepared in the modified way.

2. It yields higher total counts than the standard agar for all milk products.

3. It permits of a valuable qualitative differentiation of each plate.

4. The agar aids in culture isolation by giving a characteristic property picture of the colony being fished. It is urged that the American Public Health Association carefully reconsider its hasty disposition of milk powder agar as a possibility in routine examination and give this modified medium a trial.

Above all, the dairy bacteriological laboratory in all colleges and universities should include this medium in their regular laboratory exercises, if for nothing more than to furnish a clear and memorable picture of these two properties of bacteria—the production of acid and the production of proteolytic enzymes, and how valuable casein is to show them simultaneously.

PHOTOGRAPHS

The photographs of plates made on milk powder agar are included, through the courtesy of the *Ice Cream Trade Journal*,[3] for the purpose of giving an idea of the differentiation of colonies possible through its use.

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HEALTH EDUCATION

Those concerned with education and public information in the health field will share in the publicity activities in connection with the National Conference of Social Work, meeting this year at Washington, D. C. The conference sessions will run through Wednesday, May 16, to Wednesday, the 23d, although the main events of professional interest to workers in education and publicity will be concentrated during Monday to Wednesday, the 21st to the 23d. The Committee on Publicity Methods in Social Work is headed by J. Byron Deacon, director of the New York Tuberculosis Association, 10 East 39th Street, New York City.

The announced program includes demonstration sessions illustrating "The Social Worker Publicist and the Platform" and "The Social Worker Publicist and the Newspaper."

Clinics will be held for the examination, discussion, and analysis of printed matter and motion pictures. Examples of printed matter, posters, appeal letters, and newspaper clippings which are a part of the publicity output of the current year will be exhibited.

Those who may wish to enter material for the exhibit or the clinics, or wish program details, should address Mr. Deacon.

On Wednesday, May 23d, the general program of the National Conference will be devoted to "Public Opinion." There will be four group meetings in the morning from 9 to 11, a morning general session from 11 to 1, and an evening general session. Some of the topics to be discussed are: "What the Press Thinks of Social Work," "The Creation of an Informed and Responsible Public Opinion," "The Interpretation of Social Facts," "Editorial Research as a Factor in Public Opinion." Of special interest to health education workers is Group Meeting II, which has for its topic "Public Opinion on Social Welfare Questions as Indicated by the Referendum—The Referendum in Tuberculosis Campaigns," John A. Kingsbury, secretary of the Milbank Memorial Foundation, presiding.

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THE INTERNATIONAL CONFERENCE ON THE STANDARDIZATION OF SERA AND SEROLOGICAL TESTS

The second international conference of the Health Committee, for the standardization of sera and serological tests, recently held in Paris under the auspices of the League of Nations, achieved far-reaching and significant results.

It seems peculiarly fitting that exactly one hundred years after the birth of Pasteur, representatives from twelve different nations should have gathered together at the invitation of the Institute that bears his name, in the interests of science and humanity. The work of the conference was assigned to subcommittees, the meetings of which were so scheduled that it was possible to attend practically all of them. The informal discussion leading up to the final conclusions was most illuminating and stimulating for research in the broad field of infection and immunity quite apart from the definite results obtained.

It has long been realized that the introduction of uniformity into the methods used by different laboratories for measuring and testing the strength of sera would facilitate further research, besides advancing the practical application of the great achievements in the problem of immunization, but for many years all attempts in this direction met with an insurmountable obstacle in the lack of prolonged and close international coöperation. It was not until after the war that the Health Organization of the League of Nations succeeded in uniting and coördinating the efforts of many separate institutions in different countries. A program of joint work was drawn up at the first conference held in London in December, 1921, and a further advance has been made at the second conference, the success of which was in large measure due to the chairman, Professor Madsen, whose wonderful tact and foresight invariably harmonized seemingly conflicting points of view.

The adoption of the American unit for antidiphtheria serum as the international standard will clear away the confusion which the necessity of transposing

the different unit values has so long entailed. As is well known, the American unit is in principle based upon the original method of Ehrlich.[1] Similarly, the accepted approximation of the American unit for antitetanus serum will greatly aid in clarifying future study. In order to secure complete uniformity it will only be necessary for America to double the value of its present unit or, until this can be accomplished, to indicate on the label of the serum that two American units equal one international unit.

It was not apparently possible to reach definite conclusions in the standardization of other methods but the acceptance of the protection test and, in particular, of the methods of the American investigators, Cole, Dochez and Avery, at the Rockefeller Hospital, as a basis for the standardization of antipneumococcus serum marks an important step toward uniformity. Although the results of research on antimeningococcus and antidysentery sera, as well as on the sero-diagnosis of syphilis, were collated, the interest of medical science will be directed rather to the more practical results in the diagnosis of syphilis which will undoubtedly be forthcoming at the next conference, when it will be possible to consider the reports of comparative tests upon the same specimens of blood to be made by five representative laboratories in Austria, Belgium, England, France, and Germany. Thus, not actual accomplishment alone but also promise of increasing coöperation in the future marks the recent occasion as one of twofold significance.

One of the most gratifying aspects of this international gathering was the real and friendly interest in American science evinced by so many of the European representatives individually. The discouraging economic situation in Europe with all its hampering effect on medical science there, the development of great American institutions for research and the real contributions they have made, together with the work of the International Health Board of the Rockefeller Foundation which now reaches out to all parts of the civilized world, have all served to direct attention to America. We should embrace this great opportunity for coöperation, should recognize and assume all our responsibilities, bearing in mind the fact that the inspiration for our work has come from the genius of the older civilization, while patiently awaiting the time when political discussion shall cease to be a barrier to progress and the search for scientific truth. A. B. W.

1. "The unit is based on the one established by Ehrlich, and has been made by comparison with the normal serum sent to this laboratory by the Kgl. Pr. Institut fur experimentelle Therapie, Frankfurt a M., Germany."

"As this standard is based upon the one established by Ehrlich, the principles involved and the methods employed are practically a reproduction of his work." Hygienic Laboratory Bulletin No. 21, April, 1905.

□

Make your plans now to attend the Annual Meeting at Boston, October 8th to 11th.

A DEMONSTRATION IN PUBLIC HEALTH

At the fifty-third annual meeting of the Medical Society of Virginia held October 31 to November 3, Dr. B. B. Bagby of West Point, Virginia, read a paper called "Changes in a Small Town Brought About by the Health Department." The paper is so practical and carries such a lesson that it has been republished in full in the Public Health Reports for March 9, 1923.[1]

Dr. Bagby has kept a careful record of his patients ever since he began to practice medicine, and is in a position to demonstrate the changes which have taken place in his practice through the action of the State Board of Health. In the summer of 1909 he saw 158 town patients, 96 of whom had malaria, 15 cholera infantum, ileocolitis or dysentery, and 7 typhoid fever, in all a total of 108 cases out of 158 which should have been prevented. In 1907 the State Board of Health of Virginia was reorganized and its present very efficient chief, Dr. E. G. Williams, put in charge of it. In 1922, during the same months of the year, he saw 202 town patients among whom there was not one single case of typical malaria, typhoid fever or cholera infantum. There was one case of atypical malaria probably contracted out of town. There was only one case of dysentery or infectious diarrhea during the summer, and no case of typhoid fever has been noted since 1919. In other words these three diseases, which made up the bulk of the practice in 1909, have practically disappeared from the town of West Point.

The physical changes noted in this town are no less notable than the disease record. In 1909 not a dwelling house was completely screened. The negroes and poor people had no screens at all. Every dwelling, rich and poor alike, had an old fashioned open privy. The marshes in the neighborhood of the town were entirely undrained.

The chief dairyman of the town had the contract, which was let to the lowest bidder, for cleaning out these open privies and spent a part of every night at this work, doing it late at night or early in the morning. He went directly from this job to milking his cows, bottling and delivering the product, all of which was done with the full knowledge and consent of the city authorities. In 1922, 80 per cent of the milk of the town was handled in a thoroughly sanitary manner. The poorest negro tenements now have good window and door screens. The marshes have been drained, and there is no record of any case of malaria contracted in the town since the drainage was done. Complete water and sewage systems have been installed, the water coming from artesian wells 400 feet deep. The saving in doctor's bills, loss of wages and deaths has repaid the town many times for the money expended in these improvements.

Dr. Bagby's story is told in a simple, straightforward and understandable way. It holds a lesson for every health officer and for all who are interested in public health work. It is in fact an excellent demonstration of what can be done at small expense to save life and to better the conditions of life. It illustrates two of our great health maxims—the slogan of the Department of Health of New York: "Public health is purchasable. Within natural limitations a community can determine its own death rate," and the famous saying of Pasteur, "It is within the power of man to banish contagious disease from the earth." M. P. R.

1. Virginia Medical Monthly, Volume 49, No. 9, December, 1922.

THE PREVENTION OF RABIES

In the January issue of the JOURNAL we published an editorial under this same title, referring to the experiments done in Japan and confirmed in this country by Drs. Eichorn and Lyon. Since the publication of this we have received a letter from Dr. James McIlvaine Phillips of Columbus, Ohio, protesting against the acceptance of this method until it has undergone further trial and perhaps improvement. He quotes several correspondents as having reported failures not only by the one day treatment but by a six day treatment. The object of our editorial was to encourage the use of this method, and we hoped that abundant figures could be soon collected showing its value or perhaps its lack of value. We do not think the figures which have been presented to us against the method are convincing, but we are quite willing and glad to call attention to the reports of failure of this method and to advise precautions concerning its use. In other words, until it has undergone a much more extensive and severe test in the United States, we do not recommend that entire reliance be placed upon it. The article referred to in our January issue gives a good lead for research work and we trust that extensive trials will be made and that in a short time the treatment will be accorded the position which it deserves.

M. P. R.

COUNTY SYSTEM OF REGISTRATION TABOOED

For nearly twenty years now the Bureau of the Census, the American Medical Association, the American Public Health Association, and other agencies have been urging the various states to improve their laws governing the registration of births and deaths, that complete and accurate records may be available both for purposes of registration and for purposes of measuring public-health activities. The registration machinery given in the *Model Law* has served as a basis of all good registration laws enacted in the last twenty years and to-day only three states, South Dakota, Nevada, and Arizona have unsatisfactory laws. Unsatisfactory, almost solely because they still have the *Tabooed* County System of Registration, which calls for the transmission of certificates from the local registrars to county officials and thence to the State Registrar.

The county system is tabooed for several reasons: (1) The county unit is too large for one registrar to watch thoroughly and obliges undertakers to travel too far for the required burial permits. The ideal registration unit should not exceed 50 to 100 square miles. (2) County officials may have little interest in the registration of births and deaths and may neglect this part of their work; yet attempted legal action by a State Registrar against negligent county officials would probably be unsuccessful and only result in ill feeling. (3) County officials are not appointed by the State Registrar and therefore his control over them is limited. (4) County officials can not be removed by the State Registrar. (5) If the county official has numerous subregistrars reporting to him, there is lacking the direct transmission of certificates from the local registrar to the State Registrar, so that when a certificate fails to reach the State Registrar he does not know where to place the blame.

Where there are county health officers they should be informed immediately of deaths from communicable diseases and a law should be enacted obliging local registrars to transmit copies of certificates of such deaths immediately to the health

officer, but it is not advisable or necessary to jeopardize good registration by routing the original certificates through the county health office on their way to the State Registrar.

No extended argument seems necessary; the mere statement of the above reasons conclusively shows that the *County System of Registration Should be Tabooed*.

W. H. D.

BOTULISM

We have already given some advanced information concerning the work of the California Commission on Botulism.[1] This report of this Commission is now available[2] and on account of the extreme interest and importance of the matter it seems advisable to give some further facts as brought out by the Commission.

It appears certain that food poisoning has increased in the United States during the past ten or twelve years. In 1910, 157 deaths were reported from this cause against 842 in 1918. How many of these were botulism is not entirely known, but at most they make only a small minority. Since 1889, 91 single or group outbreaks have been reported for the United States and Canada, in which 345 persons have been affected, with 213 deaths.

Botulism has excited wide attention only since the war, on account of several tragic accidents which occurred soon after the armistice in the cases of returned soldiers. From all available records it seems that the disease is rather new in this country, the first characteristic cases having been described between 1889 and 1902. The case mortality is extremely high, averaging 61.7 per cent. Only one-third of the outbreaks from which these figures are derived have been proven bacteriologically and toxicologically. The causative food in 63 outbreaks was home or commercially canned plant products, while in 19 animal products were apparently responsible. Home canned string beans head the list in mortality. In Europe pork or meat products are the most frequent cause of botulism while in the United States vegetables are the usual cause, for reasons not well understood.

Botulism is not confined to the human being. It is well known in horses and other domestic animals. It often goes under the name of forage poisoning, and in chickens produces the condition known as limberneck. It is not positively known that all of the cases which occur in the lower animals and birds are true botulism, but a number of them have been so proven by bacteriological and other tests, and it is a common experience to find outbreaks in chickens due to throwing out spoiled canned goods. Of 106 outbreaks in poultry tabulated by the Commission 30 were due to home canned string beans.

Certain lessons ought to be learned from this most valuable report. It is conclusively shown that the vast bulk of the output, both commercial and home canned, is safe for human consumption. While this may make the average person feel safe it is not much satisfaction to those who are poisoned. The second lesson is that all canning methods, whether commercial or home, should aim at the absolute sterility of the food canned. Foods to be canned must be fresh, clean and in good condition. It has been shown with a reasonable certainty that unsalable or moldy apricots are more dangerous than fresh, sound apricots. The presence of other bacteria and fungi seem to favor the growth of the botulinus bacillus. The organism can grow unaided in olives, spinach, corn, asparagus, beets, peas, arti-

chokes, apricots, peaches, pears, and prunes, and cases of poisoning from the eating of almost all these products have been reported.

Considerable confusion has arisen in the mind of the public concerning the evidences of danger as shown by the spoilage of the food. Statements have been published that dangerous foods can be detected by evidence of spoilage. This has been definitely shown to be untrue. While careful inspection of the food will often show that it is not up to standard, it is by no means universally true that the production of botulinus poison can be detected by the senses. A safe rule, however, is that all foods which show any departure from the normal should be discarded. The botulinus germ is not a pathogenic organism. There seems to be little doubt that people living in certain highly infected districts ingest large quantities of botulinus spores from time to time and that no harm results from them. Botulinus poisoning seems always to be due to a preformed toxin produced in the canned product. There is no evidence that the germ can grow in the human body and produce its characteristic symptoms there. Foods can always be rendered safe by boiling. This boiling should continue for at least 30 minutes. The spore of the germ is extremely resistant to heat, requiring boiling for six hours in order to certainly destroy it. The poison is not nearly so resistant to heat and can practically always be destroyed by boiling from 30 to 40 minutes. An investigation of outbreaks shows that they are due to the eating of canned foods cold or insufficiently heated. Poisoning is particularly seen in those vegetables used as salads, such as string beans, beets, asparagus and ripe olives.

The treatment of botulism is not satisfactory. There is no treatment which has any particular value except possibly serum therapy. From the laboratory standpoint the serum is entirely efficient. In actual practice there is always delay in its administration. It will be remembered also that apparently two types of botulinus have been demonstrated, known as A and B, the former being much more prevalent in the United States. In some cases in which serum has failed the homologous serum was not administered. In six outbreaks homologous antitoxin was administered and these afford the only reliable data at hand upon which we can base conclusions. In these six outbreaks 31 persons were affected and 23 died. Seventeen died before the administration of antitoxin and 6 after receiving the injections. One person recovered without antitoxin and six after its administration. It is certain that the botulinus antitoxin is of no value when given late in the intoxication, and there is no record of its administration sufficiently early to afford a just comparison with the results obtained under experimental conditions. It should be used at the earliest possible moment, given intravenously and in large doses of 20,000 units. A single dose should be sufficient as there is no evidence of the continuous formation of the poison.

It is impossible to do justice to this report in a review. The bulletin is recommended to the careful consideration of all health officers and others interested in this subject. The epidemiological work, which is most extensive and excellently done, was carried out by Dr. J. C. Geiger of the U. S. Public Health Service. The other parts of the work were done by Dr. E. C. Dickson of the Leland Stanford University, Medical School, and Dr. K. F. Meyer of the University of California. M. P. R.

1. American Journal of Public Health, January, 1923.
2. Public Health Bulletin No. 127, Treasury Dept. U. S. Public Health Service.

RESURRECTION OF THE DEAD

It will be remembered that President Harding during his campaign pledged himself to the creation of a new department, the purpose of which should be the welfare of the people. In his first message to Congress he recommended the creation of such a department. He carried his family physician to Washington, made him a Brigadier General direct from civil life, and charged him with the formulation of detailed plans for the new department.

Two bills were introduced into the Senate in the spring of 1921, one by Senator Kenyon and the other by Senator McCormick, both having the same object, and differing only in details. The title "Department of Public Welfare" met with more favor than others proposed. Both bills provided for a department to be presided over by a secretary with a seat in the Cabinet, and assistant secretaries in charge of the several divisions. The plan which the President approved of provided for four divisions: Education, Public Health, Social Service and Veteran Service Administration. At the Boston meeting of the American Medical Association, General Sawyer presented the plan with a twenty-one page statement of argument and explanation. Certain hearings were held in connection with the bills, but they soon passed from notice and sank into oblivion.

The matter has recently been revived, and a conference was held in the office of General Sawyer on January 17, to consider plans for the coördination of federal health activities. It is now proposed to call the new department the Department of Education and Welfare, to be presided over by a cabinet officer with the title of Secretary. The plan further provides for an assistant secretary and four directors-general, the latter to be in direct charge of the four bureaux, education, public health, social service and the Veterans Bureau. All existing governmental agencies (except those of the army and navy) relating to education, health, social welfare and the rehabilitation of veterans are to be transferred to the new department, with their present powers, appropriations and personnel.

We have for a long time felt that our Government should recognize the importance of health in the progress of the nation by creating a department headed by a cabinet officer for its care, such a department, for example, as proposed by Senator Owen.

At first sight the plan would seem to be an advance over what we have at present, inasmuch as it would recognize public health as a permanent care of the nation and assign it an important, although a subordinate, place in the great affairs of the nation. At present the only important body which we have in this connection is the Public Health Service which is a bureau under the Treasury Department. Other bodies like the Children's Bureau, the Bureau of Animal Industry, Bureau of the Census, etc., all of which have an important bearing on public health, are scattered through various departments of the Government. All of our health activities, including the Public Health Service, have been created for commercial purposes and not with the distinct object of protecting the health of the people of the United States.

It is stated that no interference with existing organizations is contemplated, but there is a well grounded belief, which amounts to a practical certainty, that General Sawyer, to whom the President has entrusted this matter, does not recognize the value of existing organizations and that changes in policy are contemplated which will seriously impair the efficiency of the Public Health Service. The physicians and sanitarians of this country as well as the people generally are vitally interested in maintaining the integrity of our Public Health Service, which

we believe constitutes the largest, best trained and best organized body of sanitarians in the world to-day. It has been remarkably free from political influence. The scope of its work has been tremendously extended within the last ten years until it is now in reality a national health service. In 1879 a National Board of Health was created, which functioned four years. In 1883 (ch. 114, 27 Stat. L., 449) this board was abolished, and its functions turned over to the Marine Hospital Service, as our Public Health Service was then called. Lack of funds and the doctrine of State Rights hamper its endeavors in certain directions, yet we know that at present there is not a state in the union that does not recognize and welcome the assistance of the Public Health Service. Any change which threatens to impair the efficiency and growing importance of the Public Health Service should be vigorously opposed. Although holding an anomalous position as a bureau of the Treasury Department it is only fair to recognize that it has fared well under the various secretaries of the treasury, who have recognized the vital importance of its work and have fostered its growth. Unless a department of health is created with our Public Health Service as the nucleus we doubt the advisability of any change.

The proposed department would begin life handicapped by the inclusion of the Veterans Bureau. The conduct of this bureau has not been anything for the American people to be proud of. It has been riddled with politics and marked by gross inefficiency. While the progress of time has led to some improvement the outlook is not entirely hopeful. It handles a vast amount of money running up into hundreds of millions every year, and it is too much to expect that the sheen of this gold will not attract the attention of selfseekers. The inclusion of the Veterans Bureau in the new department has been properly likened to the implantation of a cancer into the abdomen of a new born baby. We can understand how health, education and social welfare might be combined under one administrative head, although we cannot advocate any such arrangement, believing that public health is important enough to deserve a place by itself, but we feel that the inclusion of the Veterans Bureau will act as a millstone around the neck of the proposed department.

The amount of money spent by these four groups has in the last few years amounted to something like eight hundred million dollars annually. The creation of such a department will put the control of this vast sum of money under one official. We doubt that any good result will be obtained. There is unquestionably considerable duplication of effort in the various governmental activities in Washington, but we do not believe that this proposed department will accomplish any great results in lessening what is recognized as a fault in our governmental system.

The great war demonstrated the importance of public health to all nations. England and Canada promptly put into effect what they learned by the establishment in each country of a Ministry of Health. The United States has not yet thoroughly learned its lesson. We believe that the importance of public health should be recognized publicly by the creation of a department ranking equally with the other departments now in existence. The formulation of plans should be put in the hands of experts who have had special training and experience in public health work along the many lines now included. Training and education rather than cults and politics should determine the selection of these experts.

The Surgeon General and certain other officers of our Public Health Service have been in touch with such matters for many years, and are exceptionally well fitted by training and experience for the task. A proposition from the service would command the confidence and respect of the medical profession as well as the public.

M. P. R.

HEALTH OFFICERS' EXCHANGE

A SMALL TOWN HEALTH EXPOSITION

"Let Health Rule in Bethel" is the slogan adopted by a little town of less than 2,000 population in Ohio, the first little town to try to adapt the health exposition idea to a small community. Bethel deserves great credit for having the courage to face so pretentious an undertaking. To be sure, the health exposition idea during the past two or three years has spread with great rapidity in the larger cities, but there have been, so far as is known, no small towns that have attempted to adapt the exposition idea to its own needs.

Perhaps it was because Bethel is located near Cincinnati, where the success of the health exposition held in 1921 has not yet faded out of mind, that Bethel conceived the idea. At any rate, the Public Health Federation which was responsible for the Cincinnati exposition has in some small measure helped Bethel to work out its plan. The Bethel exposition was held March 18-24. The local *Journal* carried a prominent headline on all of its issues and numerous articles in the most prominent positions on the front page of the paper every issue, showing that the idea is selling itself to the community. The publicity program included, in addition to the very excellent articles in the town's newspaper, advertising in all the county papers, handbills posted in various public places in the surrounding towns, automobile placards with advertisements and similar features.

Bethel has an exposition hall where exhibits were held during the health week and an auditorium in which a program of entertainment, motion pictures and addresses were given every afternoon and every evening during "Health Week." The program started off with a health sermon at each church in the community on the first Sunday of the Exposition. Each grade in the public schools prepared a health playlet or some kind of appropriate health demonstration. This demonstration was the first thing on each program each afternoon and evening. It was followed by an address on an appropriate health subject given by some public health worker or physician from the nearby cities or the State Health Department, and that in turn by a health film relating to the speaker's subject. In addition there were on the program setting-up exercises by the school children, toothbrush drills, demonstrations in home making, and other interesting features.

All the merchants in the town participated by decorating their stores, and all citizens were asked to adorn their homes so that the town would present a festive appearance during "Health Week." Merchants presented special displays of their wares that help promote or maintain the health of the community. Poster contests in the public schools brought forth a multitude of colorful posters which were placed in the shops and in public buildings.

The exposition was promoted by a group of prominent citizens, and they secured the coöperation of most of the leading health organizations in Cincinnati, of their own county health commissioner, and of the State Department of Health. Among the special features of the "Health Week" was a demonstration by officials of the State Department of Health in Schick testing to determine immunity from diphtheria. A magna vox radio instrument was installed in the auditorium so that, interspersed with the regular program of the exposition, they were able to tune in music and entertainment features from various parts of the country. In the exhibit halls were poster exhibits on nutrition, recreation, dental hygiene and infant welfare, and many other subjects, and also mechanical exhibits and demonstrations and other features that proved worth while to a community of this type.

It is an interesting thing to have so small a community undertaking a project of this scope. Bethel has found a way of interesting a small community in the public health —a contribution of no mean value.

BLEECKER MARQUETTE,
Executive Secretary.
Public Health Federation, Cincinnati, O.

MIKADO'S PHYSICIAN HERE!

Six of Japan's foremost medical scientists, headed by Dr. Kinnousuka Miuro, physician to the Emperor, arrived in New York from San Francisco on a three months' tour of this country's medical centers, as guests of the Rockefeller Foundation. The purpose of the visit, in which the Japanese government is coöperating, is to make a survey of American institutions and methods and to promote a better understanding between scientific men of the two countries.

The Mission in Conference in New York.—Left to right—Dr. Kinnousuka Miuro, Dr. Sahachiro Hata, Dr. Mataro Nagayo, Dr. Akira Fujinami, Dr. Keinosuke Miyairi, Dr. Yoshihiro Takaki.

CORRECTIONS

Dr. H. J. Gerstenberger, whose article on "Preventive Infant Feeding—Its Simplicity," appeared in the March issue of this JOURNAL desires that the editor call to the attention of our readers the following corrections:

Page 187, 2d column, 6th line, replace "he" with "Schloss."

Page 191, 1st column, 2d paragraph, 4th line, insert after "produce" the words "by its absence."

Page 192, 2d column, 1st paragraph, 16th line, replace "more" with "less."

Page 192, 2d column, 2d paragraph, 1st line, replace "The requirement" with "This requirement."

Page 193, 2d column, 10th line, replace "education" with "advice."

Page 194, 1st column, 4th paragraph, 10th line, change "material is altered" to "material may be altered."

Page 194, 2d column, 2d paragraph, 16th line, the sentences from line 16 to line 33, beginning with "Possibly" and ending with "disturbance," are to be replaced by the following: "Possibly by again calling attention to the fact that human milk is satisfactory to the human infant because of its peculiar physical, chemical and biological make-up, and especially because of the definite relationship of its individual food constituents to each other—a characteristic whose many sided importance is too little

appreciated—it will suffice to make clear why as complete an adaption to human milk of an artificial food as it is possible to accomplish is the goal to attain, if it is our desire to remove from the diet as many as possible of the factors that might aid in the development and furtherance of a nutritional disturbance."

Page 195, 2d column, 7th line, replace "longer" with "long."

Page 195, 2d column, 10th line, after "determinations" insert "of the sera of infants fed such a food over long periods of time."

It is Dr. Gerstenberger's intention to have reprints for his article, and these reprints will contain a complete bibliography.

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LETTER FROM THE DEPUTY MINISTER OF HEALTH, ALBERTA

In your issue of February, 1923, in an article written by Dr. O. P. Kimball, the following statement is made:

> "There are certain localities in these large districts in which the incidence of goiter is very high. For instance, in parts of British Alberta and Columbia(?) and in some of the glacial valleys of Southern Alaska all the domestic animals have goiter."

May I quote a letter from our Provincial Veterinarian, Dr. Talbot:

> "I have read the article on the prevention of simple goiter by O. P. Kimball in the February number of the American Journal of Public Health, in which he states that in some localities in Alberta all domestic animals have goiter.
>
> "As Provincial Veterinarian for the Province of Alberta I believe I am thoroughly familiar with its live stock conditions, and I do not know of any district such as he describes. You frequently meet with goiter cases in young lambs and calves, some years it being much more prevalent than others, but our observations have failed to find it in adult animals, except in rare cases."

This deals with the question of goiter in animals. The incidence of goiter in human beings is no higher in this Province than in any other of the Provinces of Canada.

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LETTER FROM DR. O. P. KIMBALL

Concerning the communication from the Deputy Minister of Health in the Province of Alberta and the quotation from Dr. Talbot, permit me to say that Dr. Talbot's own letter is excellent proof of the statement I made concerning the Incidence of Goiter among Domestic Animals in some of the sections of this Province. It is a well-known physiological fact (see "Physiology of Thyroid," by David Marine, in *Physiological Review* of October, 1922) that the herbivora, and especially sheep and cattle, have a tendency to overcome thyroid conditions in the severest endemic goiter districts, and goats may even survive for months and even years after a complete thyroidectomy. In this section, which is commonly considered a mild endemic goiter district, we seldom or never see goiter in lambs or calves, yet approximately 50 per cent of the street dogs have goiter. I am wondering if Dr. Talbot ever made any close observations and could give any information on the incidence of goiter among the dogs (carnivora) in his section.

I am sending you a reprint of an article published in the *New York Medical Journal* of March the fifteenth concerning "The Incidence of Goiter among Animals in British Columbia."

During January Dr. John D. Milne, surgeon of Calgary, Alberta, visited me a week to study the details of the prevention of goiter among school children with the idea of carrying it out through the public schools of Calgary. Dr. Milne told me that a very high percentage of the street dogs in Calgary had large goiters. He also stated that, while he could not give any definite information concerning the incidence of goiter among the other domestic animals, he knew personally that the superintendent of Prince Edward's Ranch, which is near Calgary, has received special instructions to carry out the prevention of goiter among cattle, sheep and hogs. Dr. Milne also stated that many of the brook trout from the glacial lakes around Calgary have goiters.

Dr. Shepherd of McGill University, in his monograph on "Enlargement of the Thyroid or Goiter, Report of the Commission of Conservation of Canada," December, 1918, gives his personal observations of goiter among animals in the Provinces of Alberta and Columbia. Dr. Marine also states from his personal observations that the incidence of goiter is high in some sections of Alberta and Columbia among domestic animals.

Considering the letter from Dr. Talbot, in which he states that you frequently meet cases of goiter in young calves and lambs, and from the observations of other men, I feel that the statement concerning goiter in domestic animals is true. Concerning the incidence of goiter among school girls, I have never seen any definite statistics. However, I am hoping to hear from

Calgary, and personally feel that when they come to taking close observation they will find the incidence of goiter among school girls is fairly high.

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RICHARD CORCORAN LAPPIN

Richard Corcoran Lappin, born August 31, 1862, entered the Federal Service in the eighties. He became connected with the Eleventh Census in charge of the tabulation of the population of Cuba in 1890, following into vital statistics work, and in

Richard C. Lappin

1902 he was chief of the Division of Vital Statistics of the Bureau of the Census. In 1914, following the resignation of Dr. Cressy L. Wilbur, as chief statistician for vital statistics, Mr. Lappin became chief statistician pending the appointment of a physician to this position. In 1916 he resumed the position of chief of division. In 1918 he became supervisor of the census of Hawaii, enumerating the population of the islands and collecting statistics of manufactures, agriculture, and finance. On the completion of the census of Hawaii he became supervising special agent for the Bureau, charged with the compilation, under the direction of the chief statistician for vital statistics, of the special volume of Mortality Rates, 1910 to 1920, and also with the promotion of registration in the states. He completed the special volume of Mortality Rates and was engaged in testing death registration in Missouri when his death occurred, March 18, 1923, after a brief illness of less than an hour. Mr. Lappin served as secretary of the Vital Statistics Section of this Association from 1916 to 1919 and 1922 to date. He was also a member of the American Statistical Association. The Bureau of the Census has lost a most valued official and the Association a faithful and most helpful member by the death of Mr. Lappin, always loyal and unswerving in his duty.

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DR. MONAGHAN SUCCEEDS SENATOR COPELAND

DR. HENRY F. VAUGHAN, Editor, JOURNAL of the American Public Health Association, Detroit, Mich.

DEAR DOCTOR VAUGHAN: Your invitation to submit a statement for publication in the JOURNAL of the American Public Health Association is doubly welcome, first, because I accept it as a friendly gesture of greeting, and, second, because it offers me an opportunity to place myself in closer communication with the Fellows and Members of the American Public Health Association who are coworkers in the field of public-health administration.

In assuming direction of so highly developed and efficient an organization as the Health Department of the city of New York, I cannot but feel keenly conscious of my responsibility to maintain the fine traditions that have distinguished this department and others that have been in the lead in public health work in this country. Public health administrators are faced with a number of most important public health problems, such as the prevention of the so-called degenerative diseases and other preventable causes of sickness and death, by periodic medical examinations, the development of mental hygiene activities as a part of the program of public-health administration, the furtherance of humane but yet efficient methods for the control of venereal diseases, the standardization of public health adminis-

tration so far as practicable. These are some of the pressing problems that concern us.

While I am appreciative of the sources of strength, and of the capabilities of the members of my staff in the Health Department of the city of New York, I am yet most anxious to avail myself of this opportunity to convey to my fellow-workers in the field of public-health administration, throughout the country, my keen desire to establish intimate and cordial relations with all of them, to the end that we may support one another by friendly counsel and interchange of views in seeking a solution for the many urgent problems in

Frank J. Monaghan, M.D.

public-health administration with which we have to deal.

With the assurance that the Health Department of the city of New York will, so far as it lies within my power, be at all times ready to do its share in furthering the standards of public-health administration in this country, and in the hope of strengthening the ties of friendship which this Department has established with all public health officers in this and neighboring countries, I am,

Very sincerely yours,

FRANK J. MONAGHAN, M.D.,
Commissioner.

THE HEALTH OF SOVIET RUSSIA

Scientists are coöperating while diplomats wrangle and fight. Possibly this is because scientists are obliged, in their daily tasks, to face facts. Facts, and deductions from them, are their constant concern. The scientists of the world are facing certain facts regarding Russia: the fact of poverty, the fact of famine, and the fact of widespread disease. They are confronted by the fact that germs do not recognize political frontiers. They know too that, whatever the disagreeable political convictions of Russians, epidemics in Russia are a positive danger to the rest of the world. Russia has been for some time past the stronghold of certain highly infectious diseases which have made rampant incursions into adjoining countries.

This is the reason that, while official France and the Soviets are bitter enemies, the Pasteur Institute in Paris and the Russian scientists in Moscow and Petrograd have been coöperating in saving life and in advancing the interests of science. While Soviet Russia refuses officially to recognize the League of Nations, she sends a scientist (the director of the Russian health service) to confer with the League of Nations' Provisional Health Committee, which is composed of most distinguished medical scientists. Leaving all political issues aside and untouched, this committee considered, with the Russian scientists, the situation in Europe and, having looked unpleasant conditions squarely in the face with a degree of frankness and realism which diplomats rarely achieve, they gave mutual advice and promised mutual aid in solving difficult health problems and in advancing scientific knowledge.

All of this came about in the course of meetings of the International Health Committee, a body specially constituted to allow Russian scientists the advantage of conference with the Provisional Health Committee of the League of Nations. The International Health Committee is simply the Provisional Health Committee of the League of Nations plus a representative of the Soviet health service. Dr. Siemashko, director of that service, told the International Committee the woeful tale of disease in Russia.

Siemashko reported that typhus had remained an ever-present menace, strength-

ened and extended by famine. Nearly a million cases of malaria were reported during 1922. Cholera epidemics were serious but that disease, together with smallpox, scarlet fever, and diphtheria, are happily now on the decrease. Tuberculosis is extremely serious; there having, however, been a decrease since 1920, when the death rate was 510 per 100,000 population. The prevalence of venereal diseases has generally decreased but is still serious in certain villages. Extra-genital syphilis is more widespread than other forms, it is reported. A test was made to discover the degree of prevalence of venereal diseases among the students of Moscow, and 15.5 per cent were found to be infected. Children under one year of age have been dying at the appalling rate of 26.5 per 100. The fact that one-third of the population was affected by famine has accentuated all Russia's ills and disorders.

The Soviet health service has instituted vigorous, even though inadequate, measures to correct these wretched conditions. A national health organization was created, "by decree," providing for at least one medical officer of health for every 50,000 inhabitants in cities, and one medical officer and one assistant for every 200,000 inhabitants in villages. Also, one house inspector for every 50,000 inhabitants was decreed. We are not informed as to how far the Soviet authorities were able actually to set going this organization, so easy is it to issue decrees but so difficult to find competent health workers. Thirty thousand beds are available for the victims of epidemics and in addition 10,000 beds, located at strategic points along railroads, have been provided for persons stricken with an epidemic disease while traveling. Special emphasis is given to child welfare work in Russia, but although 580 crèches have been provided, sufficient to care for 270,000 children, only about 3 per cent of the need has been met. Several clinics and dispensaries for the treatment of tuberculosis have been set up, as well as 32 stations from which the campaign against malaria is carried on. Venereal disease clinics have been opened in many of the largest and in some of the smaller towns in Russia. While prostitutes, who must be especially considered in combatting venereal diseases, are segregated, no provision is made for their compulsory medical examination. Two hundred thousand gold rubles, a colossal sum in the present paper currency of Russia, was expended in these health measures in 1922. In addition to the continuation of the measures previously mentioned, the Soviet health service expects, during 1923, to carry on widespread health educational work, sanitary inspection, and free distribution or sale of soap and *hot water*. Imagine conditions which require the public authorities to provide hot water!

Under the pressure of financial embarrassment the Soviet government has made concessions to popular demand in the control of alcoholic beverages. Wine up to 18 per cent alcoholic content may now be sold, and brandy may be sold upon doctors' prescription. Certain of the especially vicious spirituous drinks, usually distilled by peasants, have been prohibited altogether, and vigorous measures have been taken to suppress their distillation and distribution.

The Soviet health authorities have employed vaccination quite extensively as a method of protection against cholera, typhus, dysentery, diphtheria, smallpox, and typhoid fever. Ninety per cent of the soldiers of Soviet Russia have been vaccinated against cholera and vaccination is to be repeated each year. Vaccination against typhus has been widely and variously tried, but without marked success. Vaccination *per os* (through the mouth) against dysentery, cholera, and typhoid fever has been tried. The material for this vaccination through the mouth was received from the Pasteur Institute, and the first experiments were made upon the medical staff of the Soviet health administration. The experiment is to be enlarged and international experts have been appointed, at the request of Dr. Siemashko, to represent the Provisional Health Committee of the League of Nations, to observe the experiments and to report to the committee. The liquid vaccines for these experiments will be provided, it is hoped, from sources outside of Russia. While there is in Russia no lack of ordinary vaccines, or of disinfectants, there is serious lack of drugs (especially quinine for the treatment of malaria), laboratory apparatus, sera, bedding, lint, and soap. Special assistance is needed in providing these materials and in conducting campaigns against infant mortality.

The chairman of the International Health Committee expressed the hope that help would be forthcoming to Russia in her fight for life and health. In spite of the decrease in population amounting to 13 per cent in European and 3 per cent in Asiatic Russia, the country so long stricken by war and disease is at last gradually recovering. With the hope of assistance held out by the Provisional Health Committee of the League of Nations, and with the help of scientists of many countries, the dismal picture of disease and death in Russia may gradually brighten.

WALTER CLARKE,
Administrative Secretary,
National Health Council.

AMERICAN CHILD HEALTH ASSOCIATION

That child health work in America is becoming of ever increasing importance is proved by the recent amalgamation of two of the great child health organizations of the country, the American Child Hygiene Association and the Child Health Organization of America, under the leadership of Herbert Hoover. The new organization will be known as the American Child Health Association, and its purpose is so to coördinate existing child welfare agencies that there will be formed a perfect cycle of child health work, beginning with the prenatal period and extending through school age to maturity.

The ideal of saving the lives of the American mother and her child lies behind all the plans the association is making for the future. With such officers as Dr. L. Emmett Holt, eminent child specialist; Dr. Livingston Farrand, former chairman of the American Red Cross and now president of Cornell University; Dr. Thomas D. Wood of Columbia University, Courtenay Dinwiddie, Dr. Philip Van Ingen, and Corcoran Thom, the organization is seeking to arouse the interest of every American citizen in the deplorable waste of child life and health in this country. Among the services it proposes to undertake are a consultation service for mothers in pre- and post-natal work; the strengthening of existing volunteer and state health agencies; the aid in establishment of nation-wide birth registration, and the encouragement of medical inspection in the schools. In addition to this a practical field service in medical and child health work will go upon request to communities desiring this service, and a bureau of information on health and hygiene will be founded for the benefit of mothers, teachers, and doctors all over the country. Among some of the more spectacular projects associated with the American Child Health Association may be counted the three great health demonstrations financed by the Commonwealth Fund, to be held in different parts of the country, each continuing for five years, to give mothers, physicians, teachers, and others, actual examples of the results of scientific care.

While the organizations that make up the new association do not claim full credit for the establishment of thousands of infant welfare stations throughout the United States, and the marked increase of interest in health education in thousands of school children, they do believe that they have played an important part in these improvements. In areas where statistics are available, the infant mortality rate during the last eleven years has been reduced from 133 to 80, a gain of 38 per cent.

But in spite of this the United States still ranks only sixth among the nations in its infant mortality rate. Two hundred thousand of our babies under a year old are still dying each year from preventable causes, twenty thousand of our American mothers die yearly from causes directly related to childbirth, and four million of our school children are so far below average weight as to need immediate attention to determine the causes of their being below par.

These facts urgently call for attention, and in outlining its future work the American Child Health Association anticipates the day when there shall be no child in America who: Is not born under proper conditions; does not live in hygienic surroundings; ever suffers from malnutrition, does not have prompt and efficient medical inspection and attention; does not receive primary instruction in the elements of hygiene and health.

ASSOCIATION NEWS

LIST OF MEMBERS

Proposed for election to the A. P. H. A., March 1 to March 31, inclusive
Names of Sponsors are set in **Bold Face Type**
Names of New Members are set in Light Face Type

DISTRICT OF COLUMBIA

Willard C. Smith, Washington, D. C.
Persis Putnam, U. S. P. H. S., Washington, D. C. Public Health Education. Full-time.

MEXICO

Edward J. Scannell, Tampico Towns, Mex.
A. Cuaron, M.D., Tampico, Mex. Surgeon-Physician.

MISSISSIPPI

W. S. Leathers, M.D., University, Miss.
T. P. Sparks, Jr., M.D., Jackson, Miss. City Health Officer. Part-time.

MISSOURI

A. W. Hedrich, New York, N. Y.
A. G. Gigger, M.D., Gentry Co. Health Dept., Albany, Mo. Co. Health Officer.

NEW JERSEY

Charles W. Crankshaw, M.D., D.D.S., Newark, N. J.
William Raymond Tilton, M.D., Newark, N. J. Associate Physician, Prudential Insurance Co.

NEW YORK

J. Byron Deacon, N. Y. Tuberculosis Assn., New York, N. Y.

C.-E. A. Winslow, Dr.P.H., New Haven, Conn.
Gertrude F. Baker, C. P. H., Watertown, N. Y. Executive Secretary.

NOVA SCOTIA

F. B. Royer, M.D., Halifax, N. S.
A. C. Jost, Halifax, N. S. Provincial Health Officer. Full-time.

PENNSYLVANIA

George H. Shaw, Philadelphia, Pa.
Lyle L. Jenne, Philadelphia, Pa. Chem. Engineer.

SOUTH CAROLINA

C. C. Craft, M.D., Florence, S. C.
P. H. Brigham, M.D., Florence, S. C. Health Commissioner of Florence. Full-time.

VIRGINIA

William F. Lawrence, C.P.H., Portsmouth, Va.
C. A. Krause, D.V.M., Portsmouth, Va. Chief Food Inspector.

LIST OF A. P. H. A. FELLOWS

Following is a supplementary list of Fellows of the American Public Health Association elected at the Cleveland meeting whose confirmations were received since publication of the April Journal.

LABORATORY SECTION

W. W. Browne, Ph.D.,
New York, N. Y.
H. E. Hasseltine, M.D.,
U. S. P. H. S., Honolulu, Hawaii.
Norman J. Howard,
Filtration Plant Laboratory, Toronto, Can.
J. G. Lipman, Ph.D.,
Div. Agri. Experiment Sta., New Brunswick, N. J.
Sandle C. Rosenberger, M.D.,
Jefferson Med. Coll., Philadelphia, Pa.

VITAL STATISTICS SECTION

W. A. Plecker, M.D.,
St. Bd. of Health, Richmond, Va.
George H. Van Buren,
Met. Life Ins. Co., New York, N. Y.

SANITARY ENGINEERING SECTION

A. F. Allen,
Asso. San. Engr., U. S. P. H. S., Cincinnati, O.

FOOD AND DRUGS SECTION

Isidor Hochstadter,
227 Front Street, New York, N. Y.
L. F. Kebler, M.D.,
Washington, D. C.
Ira Nelson,
Dir. Bur. Food and Drugs, New York, N. Y.

PUBLIC HEALTH ADMINISTRATION SECTION

T. B. Beatty, M.D.,
Salt Lake City, Utah.
B. W. Brown, M.D.,
U. S. P. H. S., Washington, D. C.
C. Lincoln Furbush, M.D.,
Dept. of Public Health, Philadelphia, Pa.
W. W. Johnston, M.D.,
Com'r of Health, Racine, Wis.
Guy L. Kiefer,
Detroit, Mich.
Daniel N. McClenahan,
Prov. Bd. of Health, Hamilton, Ont.
Christopher G. Parnell, M.D.,
Univ. Hospital, Ann Arbor, Mich.
Arlington Pond, M.D.,
Cebu, P. I.
W. A. Sawyer, M.D.,
Melbourne, Australia.
Prof. John Sundwall,
Univ. of Michigan, Ann Arbor, Mich.
Wm. C. Woodward, M.D.,
Chicago, Ill.

CHILD HYGIENE SECTION

Ada E. Schweitzer, M.D.,
State Bd. of Health, Indianapolis, Ind.

FRANK W. WRIGHT, M.D.

It is with extreme regret that we have received word of the sudden death of Dr. Frank W. Wright, who as health officer of New Haven, Connecticut, was well known to all members of the Association. Dr. Wright, who was sixty-eight years old, died at Palmer, Mass., after an illness of two weeks. He had gone to Palmer to visit his son, Dr. Leslie H. Wright, who is staff physician at the Monson State Hospital. Dr. Wright has been health officer of New Haven since 1889, in which year he also became a member of this Association, and at the last annual meeting in Cleveland he became a Charter Fellow.

BOARD MEETINGS AT CHICAGO

The Executive Board and the Governing Council met at Chicago on March 7 and March 8 respectively. Following are the most important actions taken:

Fellowship Applications.—It was the sense of the Governing Council that the "invitation method" of becoming a Fellow was preferable to the "application method." In other words, while a member is still free to submit an application, the custom of having sponsors submit nominations is to be encouraged. If favorable action is taken by the Association, the individual is then invited to become a Fellow. This method sometimes saves embarrassment to the Fellow and to his sponsors.

Section Officers.—It was voted to request Section Officers to submit nominations of members of standing in their sections who had not been elected to Fellowship at Cleveland.

Certificate.—An appropriation was made, and a committee appointed to prepare a Fellowship certificate of high grade and also to consider the question of Fellowship pins.

Annual Meeting.—The Council considered the suggestion that the Association conduct five day meetings instead of four day meetings, leaving one full day open in the middle of the week for trips of inspection, entertainment, etc. After discussion, it was voted that there should be four full days of meetings beginning with Monday morning, October 8.

Journal.—Dr. Vaughan, being called on by the President, made a plea for a complete return of papers by section officers in order to have them available for publication in the JOURNAL. He called attention to the By-Law prohibiting publication of annual meeting papers elsewhere without editorial sanction.

Editorials.—Dr. Ravenel was likewise called upon, and invited suggestions and coöperation of members of the Governing Council with regard to the editorials for the JOURNAL. Members of the Governing Council who were present commented very favorably upon the recent improvements in the JOURNAL under the leadership of Dr. Vaughan and Dr. Ravenel.

Health Department Practice.—Professor Winslow reported on behalf of the Committee on Municipal Health Department Practice, announcing an arrangement whereby it was expected that the U. S. Public Health Service would gather and keep up-to-date statistical information relative to municipal health department practice, and would serve as a bureau of information concerning such data. He further outlined a plan for stimulating more adequate appropriations and better health administration through publication of comparative data concerning health departments, and possibly through competitive methods.

Therapeutics.—Dr. Lipman brought up the question of the propriety of discussing therapeutic measures at meetings of the Food and Drugs Section. The subject was discussed at length. It was the sense of the meeting that great caution was necessary in this connection, and that the Association should not include on its program papers relative to therapeutic measures, unless the latter had already received the approval of the medical profession.

Correspondence Courses.—The Executive Board considered the usefulness of correspondence or reading courses in public health for untrained workers. It was the sense of the Board that such courses had best be carried on by university extension departments. Professor Winslow agreed to urge that the Committee on Training of Sanitarians organized by the Surgeon General gather information upon this subject.

A. W. HEDRICH,
Executive Secretary

EMPLOYMENT BUREAU

HELP WANTED

Help wanted announcements will be carried free in this column until further notice. Copy goes to the printer on the 8th of each month for publication on the 20th. Mail to New York office as early as possible.

In answering keyed advertisements, please mail replies separately to editorial office in New York City. In replying give age, professional training, salary requirements, previous positions held and three or more references.

Wanted immediately: Laboratory technicians. Some training in clinical diagnosis and routine procedures required. Salary $75.00 and full maintenance. No civil service or residence requirements. Position permanent if services satisfactory. Women only. Apply National Sanatorium, Tennessee.

Wanted: A nurse having training in prenatal and infant work, for a city of 17,000. State training, experience, salary expected and when available. Health Officer, Board of Health, Berlin, N. H.

Wanted: Graduate nurse for special tuberculosis work directed by health department in city of 55,000. Must have experience or special training in tuberculosis. Salary $125.00 per month. Transportation furnished by city. Apply Dr. R. L. Carlton, City Health Officer, Winston-Salem, N. C.

Wanted: Young men with experience or training, or both, for positions as full-time county health officers at salaries of $3000 plus transportation. State Bureau of Public Health, Sante Fe, New Mexico.

Wanted: Medical health officers, preferably with laboratory experience, for full-time positions in Georgia counties. Salary $2,700 to $4,000 a year, depending on training and adaptability. Additional allowance for expenses. Include training, personal particulars and recent photograph in first letter. Address State Board of Health, Atlanta, Georgia.

POSITION WANTED

Positions wanted announcements will be carried in this column. The charge is $2 per insertion. Copy should be received at this office by the 8th of the month.

Wanted: Position as director of health and physical education in university or other school by man with excellent training and experience in physical training, medicine and public health. Address 244, care of this JOURNAL, New York address.

Wanted: Superintendency of 40 or 50 bed tuberculosis sanatorium by graduate registered nurse. Excellent financier, experienced executive, competent to purchase for, organize and conduct economically all departments. Address 243 W. H., care of this JOURNAL, New York address.

Wanted: Full-time health officer in a city of 35,000 in Northwest wants to make a change to South or Southeast. Capable of organizing a health department. Reference present employer. Address 245-B, care of this Journal, New York address.

CANADIAN PUBLIC HEALTH ASSOCIATION

The Health Conference which is to be held in Edmonton, Alberta, on June 12th, 13th, and 14th, under the auspices of the Canadian Public Health Association, the Canadian Tuberculosis Association and the Social Hygiene Council of Canada, offers a program sufficiently attractive to warrant the assumption that this gathering will be a noteworthy one in the history of the Association. The increasing interest in the field of Public Health throughout the entire Dominion and especially among the Western Provinces, will undoubtedly result in a large attendance, and that the various sessions will contribute to our present knowledge something distinctly worth while, especially as it applies to the solution of health problems in rural and small urban centers, is a reasonable expectation.

The date has been selected so that those planning to attend the National Tuberculosis Association meeting in Santa Barbara or the Convention of the American Medical Association in San Francisco, can arrange to travel to these points via the Canadian West, British Columbia and the Pacific Coast, a delightful trip, which can be broken to advantage by a two or three day stopover at Edmonton en route. Further information may be obtained from the Secretary, C. P. H. A., Room 25, Medical Building, University of Toronto, Toronto, Canada.

BOOKS AND REPORTS REVIEWED

The Bacteriophage: Its Rôle in Immunity. F. d'Herelle, Pasteur Institute, Paris, Trans. by G. H. Smith, Medical School, Yale University, Williams and Wilkins Co., Baltimore, 1922. 287 pages with bibliography, price $?

It has taken American workers a considerable time to grasp with any real appreciation the significant and illuminating researches of d'Herelle, upon the curious phenomenon now recognized under the name of the phenomenon of the bacteriophage; or, if one prefers to use Bordet's designation, the phenomenon of "transmissible microbial autolysis". Long after many European workers, especially in France and Belgium had begun to take d'Herelle's early (1917) reports with some seriousness, and were engaged in confirming or extending his first experiments, there were but few American investigators who had placed themselves in a position fairly to appraise the significance of d'Herelle's studies,—much less to examine, in their own laboratories, any of the outstanding features of the lytic phenomena described by him. For this reason the minds of American bacteriologists were scarcely prepared to embrace the first compilation of d'Herelle's studies,* published in the French language as on 227-page memoir of the Pasteur Institute of Paris in 1921. And, even among those who did peruse this volume, there were many in whom the feeling could scarcely help prevail that here was the exposition of matters too remarkable for easy acceptance and too complex for easy understanding. Although d'Herelle had been publishing remarkable things since 1917 (papers which most bacteriologists showed a tendency to take "*cum grano salis*"). Even in January, 1922, there was scarcely an article in an American journal dealing with the lytic phenomenon; and the publication of d'Herelle's first book in French was a partial barrier to some who might otherwise have had the impulse to examine further into the subject.

The appearance, therefore, in 1922, of the translation of d'Herelle's memoir by Dr. George H. Smith, of Yale University, was a matter of considerable moment for many American workers—not only those who desired greater familiarity with the details of the classical researches of d'Herelle, but also those to whom the far-reaching significance of the bacteriophage was thus brought home for the first time.

As d'Herelle states in his preface to the English edition, this work is not merely a translation of the French edition. In the former certain new experimental data are added, the bibliography is extended and a new chapter on the "nature of the bacteriophage" has been incorporated.

Part I of the book comprises six major divisions of the subject matter, as follows:

I. Bacteriolysis.
II. The bacteriophage and the bacterium.
III. Virulence of the bacteriophage.
IV. The bacteriophagous ultramicrobe.
V. The bacteriophagous antiserum.
VI. The nature of the bacteriophage.

Chapter I deals with the elementary facts of bacterial autolysis and presents the more essential details of d'Herelle's technique. It considers the effects of external physical and chemical conditions on the bacteriophage, gives methods for its enumeration, and for enhancing its virulence, and presents grounds for d'Herelle's belief that the lytic agent is an endaparasite of bacteria,—*Bacteriophagium intestinale*.

The subject matter of chapter II is not clearly set apart from that of the first chapter, but deals especially with the effect of the bacteriophage on the bacterium.

Chapter III includes a list of 19 bacterial species from human, mammalian or ovian sources in relation to which lytic phenomena have been observed by the author.

Chapter IV considers particularly the unicity of the bacteriophage as maintained by the author against the view of multiplicity advanced by some of his critics. Here also is included a consideration of the probable basis of the lytic property.

* Le Bacteriophage; Son Role dans l'Immunite, F. d'Herelle, Pasteur Institute, Paris. Pub. by Masson et Cie, Paris.

In chapter V are presented d'Herelle's results from the inoculation of the lytic principle with animals, and deals also with antibodies to (1) the bacteria, (2) the bacterial toxins, (3) the bacteriophage, and (4) the lysins.

In chapter VI d'Herelle takes opportunity to answer or to rebuke the criticisms of others (Kabeshima, Bordet and Cuica, Bail and Salimbeni) regarding the ultimate nature of the bacteriophage, and again to urge his own reasons for assuming it to be a living filterable virus, corpuscular in nature (as opposed to enzymes) and propagating only at the expense of living bacterial cells.

The second large division of the book deals with the rôle of the bacteriophage in immunity and comprises the following chapters:

I. The bacteriophage and disease.
II. The bacteriophage in the healthy individual.
III. Immunization by means of the bacteriophage.
IV. The bacteriophage and immunity.

In chapter I of this section the author presents a remarkable series of operations made by him in different parts of the world on the relation between the bacteriophage and sporadic or epidemic disease, human, mammalian and ovian, including the following maladies: typhoid, paratyphoid, dysentery, bubonic plague, Pasteurella infection (buffalo) flacherie and ovian typhoid. In this chapter d'Herelle reduces the problem of infection to its simplest terms. He may well be quoted on this point: "Whatever may be the disease considered, the picture remains the same (with reference to the bacteriophage); when a pathogenic bacterium is introduced into an organism one of two things may happen: first, the intestinal bacteriophage shows an activity for the bacterium, the latter is destroyed before it can develop, and disease does not appear. Second, the intestinal bacteriophage is inactive, the bacterium develops and disease results." D'Herelle then proceeds to say that in the course of the disease one of two things may happen: first, the bacteriophage in contact with the pathogenic bacterium may acquire virulence and destroy the organism, or, second, the bacterium may acquire virulence, in other words may become resistant to the action of the bacteriophage. And again: "The bacteriophagous ultramicrobe is transmissible from individual to individual just as is the bacterium itself. The history of an epidemic is, in the last analysis, the story of an infection with two organisms."

Chapter II is devoted to the distribution of the bacteriophage in normal individuals (man, horse, fowl, monkey, cat, cattle, buffalo, swine, rabbit and goat) and presents d'Herelle's conclusion that the bacteriophage can be found in the intestinal tract of practically healthy animals; and that "everything which at any time may be contaminated by the excreta of any animal must contain it." D'Herelle regards it everywhere as the principal factor in the destruction of bacteria.

In chapter III the author reports the successful result of attempts to immunize against dysentery, Pasteurella infections and ovian typhoid by injecting the lytic substance, and in chapter V are presented his final conclusions.

This work of d'Herelle, embracing the result of five years or more of study, will make a strong appeal to many sorts of readers. To the biologist it presents food for thought with reference to the possibility of the existence of living, corpuscular forms more intangible and minute than any hitherto known. The geneticist will find interest in the reference to Bordet's view of the lytic phenomenon as a transmissible bacterial autolysis, with its implication regarding the inheritance of acquired characters by bacteria also in the effect of the bacteriophage in causing bacterial "mutations." To the physiological chemist who reads between the lines and does not permit himself to accept too readily d'Herelle's conclusion as to the virus-like nature of the bacteriophage, the book is full of suggestiveness regarding the possible relation between transmissible lysis and spontaneous enzyme action. For the bacteriologist it has a wealth of interest involving problems of bacterial mutation and physiological modifications in bacteria submitted to the action of the bacteriophage. He also, as a pirate upon every biological field of study, will find himself particularly engrossed in the chapters on the nature of the lytic agent. Needless to say he will also find of value the exposition of d'Herelle's technique in

the conduction of laboratory tests upon the lytic phenomena. For the immunologist the relation of the bacteriophage to immunity reactions is likely to expand the field of immunological study along paths hitherto untraveled.

Although d'Herelle's book does not purport in the least to serve as a guide for disease control, the public health worker may benefit by a glance through the door which d'Herelle has opened into some of the fundamental problems of epidemiology and disease control. Even the clinician cannot fail to find in the chapters on "the bacteriophage and disease" and "immunization by means of the bacteriophage" a stimulating introduction into a field of clinical practice, the significance of which, although at present difficult to appraise, gives promise of new therapeutic and prophylactic procedures of distinct worth.

Considering the book as a whole, there are some who will feel irritation at its dogmatic assertiveness, and sometimes not unequivocal evidence in favor of this or that conception of its author. But dogmatism, in the long run, favors controversy and invites refutation, and may be of value in such a book. In these days a writer is scarcely to be condemned for writing stronger than he feels, although in the present case there is no ground for assuming that d'Herelle feels less strongly than he writes.

Others will criticize the presentation for its somewhat disorderly arrangement of subject-matter, the failure of chapter headings in some instances clearly to convey the true import of their content, the noticeable repetition and reiteration; it is undoubtedly true that the book suffers from the lack of an index. But these matters are of slight import when measured against the fact that whatever modifications future researches may demand of d'Herelle's hypothesis, he has succeeded in conveying in clear and forceful style an unusual body of new and difficult experimental data.

In conclusion, it must be said that Dr. Smith has succeeded in giving us a translation in which one can feel that he has not lost either the meaning or the spirit of the original pages. To this fortunate circumstance the success of the English edition of the work in no small measure will be due.

The Diagnostics and Treatment of Tropical Diseases. *E. R. Stitt, Rear Admiral, Medical Corps, and Surgeon General U. S. Navy, etc.* Ed. 4, revised. Philadelphia: P. Blakiston's Sons & Co. xiii+622 pp., 1 pl., 159 figs. in text. Price, $4.00.

The fourth revised edition of Rear Admiral Stitt's handy volume treatise of the diagnostics and treatment of tropical diseases brings up to date a useful work the demand for which appears in the rapid succession of the editions. The work has undergone a very complete revision, expanding from 524 to 622 pages and with an increase in the illustrations from 119 to 159. The most important additions concern yellow fever, and the food-deficiency diseases, beriberi and pellagra. The newer uses of carbon tetrachloride for hookworm and of antimony for leishmanioses and schistosomiases and the recent developments in administering arsphenamine are included in the additions. Six new chapters on epidemic jaundice, rat bite fever, tularemia, tables of helminthic and arthropodan infections, trench fever, and diagnostics of tropical joint, bone and muscle lesions enlarge the scope of the work. The chapter on blood examination incorporates recent views as to acidosis and a table of the significance of findings in blood chemistry. Marked improvement in some of the illustrations is noted but some of the half-tones are still reproduced obscurely. In compactness, completeness and well balanced selection of material this manual is preëminent among the manuals of tropical medicine.

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A System of Character Training of Children. *C. Hardy Clark, M.D.* Seaside Printing Company, 1922. Pp. 85.

There is much to commend about Dr. Clark's book on character training even for one who must differ from him on certain points. His treatment recognizes the fact that character is not an isolated element of personality which can be trained by itself, but is intimately associated with physical growth and well being, and with mental development. The first section comprises what Dr. Clark calls the positive or objective method of training character. Its chief content is a statement of standards of development, both mental and physical, which should, he believes, be met by the normal child provided his parents are giving him proper conditions for

development and suitable training. His list of play-work for children of various ages constitutes a sort of rough scale of mental measures. The rest of the chapter contains instructions for the feeding of children of various ages and tables of expected height and weight. Parts II, III, IV, and V give discussions of how to teach a child to care for his own person, to resist temptations (particularly temptations to eat injurious foods), to take his share of the work of maintaining the home, to respect property rights, to play, to be orderly, to have moral initiative, to dress suitably, to assume responsibility for his own acts, and to use money wisely. Part V also deals with the physical and the moral conditions which are apt to limit the improvement of character. Part VI, the last section of the book, deals with graphic methods of recording a child's progress in character development. The final paragraphs are on the duty of the State in the adoption of standards for teaching and measuring character qualities.

There are many fine aspects to Dr. Clark's discussion of his topics. The responsibility of parents for the type of personality which the young child displays is clearly stated. "Generally speaking, children are nervous, restless, naughty and mentally uncomfortable because of more or less spasmodic explosions of untrained, misdirected, but perfectly healthy nervous energy. Where this condition is present, it is safe for the parent to act on the principle that the child is never at fault, but that he himself has been sadly negligent in the care of his offspring. Scoldings, 'don'ts' and sharp commands are usually wholly misapplied when directed to the child."

The importance of teaching a young child to do everything he can for himself, and of training him in habits of orderliness are excellently brought out. In order that the child may take care of himself, he must be able to reach readily the objects which he needs. "Parents should not forget that houses are built for people of adult height, and that children are seriously handicapped by this fact. If they cannot see and handle objects on shelves and tables they cannot possibly use them intelligently." Even better is his presentation of the child's training in helpfulness about the house as a coöperative undertaking of child and parent in which the parent is not a ruler but a coworker. "The spirit of coöperation and the sense of equal responsibility is wholly lost when the child is coaxed, directed, ordered, or hired to do anything in the house or about the premises."

Throughout the book the fundamental importance of a spirit of helpfulness and mutual confidence between parents and children is stressed. The foundation of desirable character traits upon happy and self-directed activity is a second cardinal principle. It is the parents who must furnish the conditions for happy and self-directed activity and who must establish a family atmosphere of mutual confidence and affection. Dr. Clark brings out the disastrous results of a treatment the reverse of the wise one in the following words: "Children often become permanently neurotic before they have arrived at the age of six years. This is because the stored up experiences of their little brains are, through bad training, largely composed of insincerities, blandishments, emotions, thrills, fears, and shocks. Absurd stories, teasing, worries, threats of punishments, physical restraints and blows sink forever into the subconscious mind, where they discolor all normal impulses, and derange orderly behavior."

There are various details on which one might disagree. His dogmatic statement that nothing but water should ever be allowed between meals is not convincing to one in charge of a nursery school in which the children are given fruit in the middle of the morning and a small quantity of milk in the middle of the afternoon and are making marvelous physical progress under this treatment. Neither does sewing on buttons recommend itself to all of us as a suitable activity for a twenty-four months old child. The rating system of character qualities which Dr. Clark works out elaborately on a decimal basis may have the virtue of leading many parents to be more systematic in their observations and more conscientious in their judgments of their own results. It may, however, assume a spurious value of scientific accuracy in the eyes of some of those who are too much addicted to external values. It is, however, scarcely fair to quarrel with details in a book whose general spirit and purpose is as fine as this one.

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Market Milk. *Kelly and Clement.* John Wiley & Sons, Inc., 1923. Pp. 445, well illustrated.

The authors, who have had extensive service with the Bureau of Animal Industry in the United States Department of Agriculture,

include in this valuable book a brief discussion of the value of milk as a food, with special emphasis upon the subject of infant feeding. The chemistry of milk is outlined and the subject of vitamins has not been overlooked. The chapters on the bacteriological control of milk and the sanitary supervision of producing farms, including the use of the score card, are written in a detailed style of fundamentals, and they should prove of interest not only to health workers but those of the public who are interested in the important problem of producing a pure and wholesome milk supply. Much space is devoted to a discussion of the city milk plant. There are plenty of illustrations and many diagrams. Following each chapter there has been inserted a valuable list of references.

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The Practice of Medicine in the Tropics. *Byam and Archibald.* Vol. II. London: Henry Frowde and Hodder and Stoughton, 1923. Pp. 825.

This constitutes the second volume of a valuable work toward the success of which many English and American authors have contributed. The present volume is introduced by a long chapter on "The Differentiation Diagnosis of Acute Disease in the Tropics." Valuable illustrations are included, many of which are in colors, and in addition temperature charts clarify the statements. They portray the history of each case. Sir P. W. Bassett-Smith has written a chapter on Malta Fever, of interest to the epidemiologist as well as the clinician. An American author, Dr. Victor G. Heiser, writing on Bubonic Plague, lays special emphasis upon his work in the Philippine Islands. J. Alison Glover and E. G. D. Murray write on Cerebrospinal Fever; Sir Leonard Rogers, on Asiatic Cholera, and Philip H. Manson-Bahr covers the subject of Bacillary Dysentery. Dr. George W. McCoy, director of the Hygienic Laboratory at Washington, has written on Leprosy. The chart showing the world-wide distribution of this disease is very valuable as are likewise the photographs portraying the skin lesions. Dr. George E. Bushnell has written on Tuberculosis in the tropics. Dr. Hideyo Noguchi writes on Infectious Jaundice. Dr. H. R. Carter covers the subject of Yellow Fever, and John L. Todd on the Relapsing Fevers. Other chapters and their authors are Syphilis, by William Fletcher; Yaws, by Aldo Castellani; Amoebiasis, by Clifford Dobell; Trypanosomiases, by B. Blacklock; Leishmaniases, by R. G. Archibald, and Malaria, by S. P. James and S. R. Christopher. This book, which contains an elaborate index, should be indispensable to the health officer who anticipates work in the tropics, or to the clinician who is confronted with the problem of diagnosing tropical diseases. The book will make a worthy addition to any medical library, written by authors of international reputation it contains the most up-to-date information with regard to the pathology, etiology and epidemiology and treatment of tropical diseases.

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Animaux Venimeux et Venims. *Marie Phisalix.* Masson et Cie, Paris. 2 vols. 1922. Vol. I, xxv+665 pp., Vol. 2, xii+664 pp., with 19 plates (8 in color), and 521 figures in text. Price, 120 francs.

In Laveran's preface to this monumental work on venomous animals and venoms we learn that Madame Phisalix and her late husband, Dr. Cesaire Phisalix, have made more than two hundred contributions to the scientific investigation of the subject of this elaborate monograph. This work was in the main carried on in the great Museum of Natural History at Paris and is a worthy exposition of its resources and of the breadth of view which research from its laboratories exhibits.

The two volumes constitute a systematic treatment of the structure and comparative morphology of poison glands or their equivalents in the various classes of animals from the Protozoa to *Ornithorhynchus* which seems to be the only mammal producing venom. The first volume is devoted to the Protozoa, Coelenterata, Echinodermata, Worms and Crustacea, Arachnida, Insecta, Mollusca and fishes. The second deals with amphibians, lizards, snakes, and *Ornithorhynchus*, and concludes with a general chapter on the biological functions of venoms and their use in therapeutics.

In addition to the anatomical and morphological treatment of the organs of venomous animals there is also given, wherever investigations have made such discussion possible, a very detailed and ample account of the physiological action of the venom on experimental animals, of the properties of the

venom, and of its effect upon the functions and tissues of poisoned animals when introduced in a variety of ways. Thus 96 pages are devoted to this discussion of the venoms of amphibians. To the physician and biologist alike the very wide range of the occurrence of venoms throughout the animal series is little less than astounding. The list includes amoebæ, ciliates, corals, Portuguese man-of-war, sea urchins, parasitic flatworms and roundworms, myriapods, spiders, mites, scorpions, flies, mosquitoes, kissing bugs and bed bugs, caterpillars (with stinging hairs), ants, bees, hornets, wasps, cantharid and other beetles, water beetles, devil fishes and certain gastropod mollusks, the mussel, a long list of fishes both fresh water and marine, including the sharks, skates, rays, cat fishes and other bony fishes with poison glands at the bases of the sharp spines of their fins, eels, morays and lampreys whose blood is toxic, and others whose flesh or ova have toxic properties. The lower vertebrates generally seem to be well endowed with capacities for the production of venom. Although little investigation seems to have been made on the epidermal slime of fishes, that of the amphibians supplies the main source for the toxins of this group. The dermal glands of the salamander and the toad are notoriously toxic while the glands of the mouth only supply the deadly venoms of lizards and snakes. No birds are known to produce venoms and only a single mammal. The male Ornothorhynchus has femoral glands opening near the spur on the hind legs which are active during the sexual period. The secretion of these glands is fatal to rabbits when introduced intravenously.

The account of snake venoms includes a discussion of quantities, toxicity, mortality, properties of the venom, action of physical and chemical agents upon its composition, the physiological action of the venoms of different serpents and from different glands, parotid and temporal, the occurrence and properties of the neurotoxins, cytolysims, haemorrhagins, haemolysins, coagulins, ferments, and precipitins of venoms, and the natural and acquired immunities to venoms. Serotherapy and local treatment of snake bites is also summarized.

This encyclopedic monograph is a classic, indispensable as a reference work for all investigators and students of this subject and for all who are concerned with the scientific therapy of animal venom. American physicians will find here a very full account of the venomous insects of this country and of the rattlesnake, mocassin, and Gila monster.

The work is very fully illustrated with many original figures, has full and carefully prepared bibliographies, a detailed analytical table of contents and both author and subject indices. It is exceptional among French publications in these respects. A few important papers published during the war have escaped the searching eye of the authoress, and quite too many typographical errors, mainly in scientific and personal names, have not been eliminated in proofreading—but these are slight defects in this superb work.

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The Determination of Hydrogen Ions. *W. Mansfield Clark, M.A., Ph.D.* Williams and Wilkins Co., Baltimore, Md. Second edition, 1922. Pp. 480. Price, $5.00 net.

Clark's contribution to science has been two-fold. In the general field of physical chemistry he has brought together, in an authoritative manner, the work of many investigators, not in the mosaic manner of so many of our "reference" works of recent years, but in a thoroughly unified structure, made possible only by the author's own extensive researches during the past decade. This contribution to chemistry is important and has and will receive its due recognition by chemists in their own journals. The present review will content itself with the other phase of Clark's work, his contribution to biology.

It was a fortunate circumstance that, in 1910, a young chemist, who had specialized under Acree at Hopkins in the theory of indicators and in acidity measurements, was brought into contact with the problems of dairy bacteriology and, for ten years, was allowed to apply himself to those problems with the resources of a government scientific laboratory at his disposal. Bacteriology is more of chemistry and less of biology than any other of the biological sciences. We study bacteria not so much by what they are as by what they do, and, with few exceptions, the reactions they carry out are measurable only in terms of chemical change. Of these chemical changes, perhaps no other has such a general or fundamental bearing as the changes in reaction or acidity.

These facts are plainly recognized in the case of the bacteria because they lend themselves to experimental study that is almost as simple in its technique as similar studies in the behavior of chemical reagents. That they are equally true throughout the entire realm of physiology—both plant and animal—will be recognized with increasing frequency as the technique necessary for the study of the more complicated life processes becomes perfected. It is therefore appropriate that the present volume is dedicated to "Fellow Workers in the Biological Sciences," and it is primarily to these rather than to his coworkers in the chemical sciences that the author addresses his discussions.

The result is an unusually clear presentation of a complicated subject. Explanations are given in the form of "pictures" often with a saving clause, against the higher critics, that this is probably not the actual case but that for the purposes of the present discussion, the various agencies act as if it were so. At times, after a simple path has been cleared, the author returns and completes the proof in a more thorough manner. One thus gains the impression of a master hand sorting out the material for use, but never of the slipshod workman overlooking essential material.

The biological worker who reads with care the early chapters of this book will find himself led through such a happily chosen entrance and by such easy grades that it seems almost a trick that he so shortly finds himself upon an eminence which he has heretofore regarded as inaccessible to one of his training. It is no trick but only a carefully chosen order and skillful manner of presentation of the material that has put him upon speaking terms with ions, electrons, equilibrium constants and the theory of indicators, and with the practical and simpler technique for the determination of hydrogen ions.

He is later introduced to the more difficult subjects of buffer solutions and to the sources of error in the colorimetric determination that has thus far been developed.

The way is now paved, and the interest aroused, for the fundamental subject matter, the electrometric methods of hydrogen ion determination. Here again the subject is presented in clear simplified form, leaving for the later chapters the theory of the hydrogen electrode and a consideration of the many practical details that enter into the actual measurement. These are given in the minute detail which only one of Clark's experience can furnish and without which the trained investigator would waste valuable time and the novice would be helpless.

Chapter XVI deals with reduction potential, an allied subject concerning which the author asks, "whether these are not significant as indices of equilibria of as much importance to the delicate adjustments of life processes as are hydrogen ion concentrations?"

The last chapter on "Applications" is an index and synopsis of the extensive bibliography of 2,000 references. This is an admirable feature, providing a ready reference for the search of the literature in any particular field. The convenience of this material is improved by its alphabetical arrangement. Despite the author's modest disclaimer of anything like completion in the bibliography it may be reasonably assumed that the important material has been listed.

This (the second) edition has been thoroughly and painstakingly revised or rewritten to keep it abreast the newer work and the number of titles in the bibliography has been nearly doubled.

The book is recommended most cordially to those whose investigations involve the determination or consideration of the influence of hydrogen ions, and the suggestion is ventured that its reading may bring a new thought to many biologists whose work has thus far seemed not to call for any consideration of this newer concept.

Outside the biological sciences but within the domain of public health there are many practical applications of the hydrogen ion methods and theory. In the field of water and sewage purification a beginning has already been made and the present reviewer looks for far-reaching results when a broader application of Clark's work has been made in this direction.

NATIONAL HEALTH COUNCIL'S HEALTH FILMS REVIEWS

The Health Films Committee of the National Health Council, representing its member agencies, has been in active operation for about nine months, and during that time has made considerable progress in the work which was assigned to it. One of the most important tasks assigned to the committee by the council was the improvement by such means as might be practicable of motion pictures on health subjects and the encouragement of the distribution of excellent health films. Among other methods of improving the quality of films

on health subjects, the committee adopted the review and criticism method. Through this method the committee has been able to make practical suggestions to a number of producers for the improvement of their health films.

The committee's procedure is to study and analyze a motion picture from the standpoint of pedagogic value, scientific accuracy, and film technique. A special subcommittee then prepares a statement embodying those criticisms, both favorable and adverse, which the committee finds to be important. If changes are found to be advisable, a statement is sent to the producer of the film to suggest how the film may be modified and improved. It is a satisfaction to be able to report that the committee's suggestions are ordinarily accepted and acted upon by producers. Reviews of films which do not require alteration will be published directly, and reviews of films for which changes are suggested will be published in due course after alterations have been made. The purpose of a review is to encourage distribution. No reviews are published of films which are considered to be generally unsatisfactory.

The interests of the National Health Council and its members are identical with those of producers of health films in that it is our wish as well as theirs to encourage the distribution of good health films and the production of better health films. Every organization and agency distributing or producing health films is therefore invited to coöperate with the National Health Council's Committee on Health Films in bringing to the attention of the Health Films Committee new films on health subjects or films which are in the process of production. The committee is endeavoring to review old films as well as new, but it is especially important to keep abreast with all new productions.

It may be mentioned finally that the committee stands ready to advise with any producer of health films upon problems arising in the course of production, and especially upon problems of pedagogic principles and scientific accuracy.

Below are given the first reviews to be released by the National Health Council for general publication.

The two films concerned were produced by members of the council, the National Organization for Public Health Nursing, and the American Red Cross, respectively.

Name of Film: **"An Equal Chance."**

Issued by: National Organization for Public Health Nursing.
Length: 2 reels.
Distributed by: National Organization for Public Health Nursing, 370 Seventh Avenue, New York City.
Purchase Price: $110 for inflammable film; $120 for nonflammable film.

Rental Price: $3.00 per showing, plus cost of transportation.
Synopsis: Shirleyville township, swept by the influenza epidemic, found itself with only one physician, others having been called to military service. An appeal made to Nursing Association in neighboring city for a public health nurse—obliged to refuse at first—later a nurse is assigned to Shirleyville—Mr. Reynolds, a rich farmer of the district, misunderstanding the relation of nurse to community, attempts to appropriate her services exclusively for the care of his sick child—nurse points out that other families must be given an equal chance. Later Reynolds, completely won over by Nurse's success. In the country school children are taught health habits by nurse and given examinations by a doctor—Shirleyville awakens to an appreciation of nurse—Reynolds induces State Health Department to send healthmobile to Shirleyville. Mass meeting is called to organize public health nursing service—in the course of meeting healthmobile shows motion pictures demonstrating work of public health nurse in its various phases, including open air schools, among Indian reservations, among negroes, etc.—Community enthusiastically decides to retain nurse.

This film is designed to acquaint communities with and stimulate an appreciation of public health nursing; intended for adult audiences, theatrical and non-theatrical; demonstrates the work of the public health nurse in combating epidemics, as well as general community nursing activities; suggests preventive measures as well as curative; touches on organization of public health nursing in community; emotional appeal effective and well balanced.

Name of Film:
"Winning Her Way."
Length: Two reels.
Issued by: The American Red Cross.
Distributed by: Society for Visual Education.
Purchase Price: $100 for used copies inflammable film.

Rental Price: $4.00 per day plus transportation charges.
Synopsis: The story hinges upon the effort of a small town Red Cross Chapter to induce the village government authorities to take over the public health nursing service then conducted by the Red Cross. The work of a public health nurse in the

public schools and in homes is shown. The film depicts the helpful coöperation between the local doctor and the public health nurse. The public health nurse, through a demonstration of her value, both in emergencies and in her routine work, finally convinces the town authorities that the service should be taken over by the town. A romantic story runs through the film.

Criticism: The film appears to be suitable for all types of audiences and is especially excellent for use in small towns. The activities of a nurse, both in an emergency and routine duties are well and attractively shown. In motion picture technique the film shows some minor deficiencies in matters of lighting and in direction.

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PUBLIC HEALTH LABORATORY NOTES

C. C. YOUNG

The Value and **Mechanism of the Colloidal Gold Test.**—In general paralysis the results of the colloidal gold test coincide with those given by the Wassermann reaction. There is a considerable degree of probability that in those cases in which the colloidal gold is positive with a negative Wassermann the gold test is the more delicate indication. The reacting substance in paretic fluids is not dialysable and resides in the globulin. The reaction in syphilitic diseases of the central nervous system depends on a physical change in the globulin associated with increased positive electric charge. This paper gives an excellent review of the literature.—John Cruickshank, *British Jr. of Exp. Path.*, 1, 71, 1920.

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The Wassermann Reaction in Pregnancy.—Author studied the Wassermann reaction on the blood of 10,427 pregnant women. The tests were made during the period from June, 1915, to June, 1919, and formed a part of the routine examination of these women. The paper draws attention to the efficacy of cholesterinized antigens in the Wassermann reaction in pregnancy, and also gives some idea of the prevalence of syphilis among women of the dispensary class. Three cholesterinized antigens were employed, and sheep cells used as the indicator. The test giving complete inhibition of hemolysis is indicated as positive and the test showing partial inhibition is indicated as doubtful. The per cent of cases giving a positive reaction was 4.18 and the per cent of cases giving a doubtful reaction was 3.85. Author concludes that a properly standardized cholesterinized antigen yields a negligible number of false positive reactions in child-bearing women.—W. A. Hinton, *Am. Jr. of Syph.*, 7, 155, 1923.

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The Sachs-Georgi Syphilis Reaction and Its Relation to the Wassermann Reaction.—A total of 296 sera were examined by means of the Sachs-Georgi and Wassermann reactions. Two hundred and seventy cases (91.2 per cent) gave the same results with the two reactions; 26 cases (8.8 per cent) showed discrepancies, but none of the discrepancies can be regarded as serious, because the largest proportion (12 cases out of 26) occurred in the cases which are suspicious to the Wassermann test but negative to the Sachs-Georgi reaction, due apparently to the lesser delicacy of the latter reaction, owing to the difficulty of detecting slight precipitation. In general, differences have been observed only in the case of weak or doubtful reactions. Accordingly, it seems unlikely that the discrepancies are due to any essential difference in the nature of the two reactions. The precipitable substance in the Sachs-Georgi reaction consists mainly of the lipoids contained in the emulsion.—Tenji Taniguchi, *British Jr. of Exp. Path.*, 2, 21, 192.

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The Kahn Precipitation Test for Syphilis.—A comparative study of the Wassermann test and the Kahn precipitation test was made

on 258 blood specimens received in the routine work of the Public Health Laboratory. There was complete agreement in the two tests in 86.4 per cent of the specimens, relative agreement in 12.8 per cent, and complete disagreement in 0.8 per cent. The Kahn precipitation test is simple, requires few manipulations, and is remarkably accurate. It should not and probably will not replace the Wassermann test, but it should be used to check it. The Kahn test will probably be soon adopted in this laboratory as one of its routine tests. We believe, with Dr. Young, that "To report the two tests to physicians gives them a more dependable laboratory diagnosis than the Wassermann test alone could possibly give."—William Levin, *Jr. Kansas Med. Soc.*, 23, 4, 1923.

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Observation on the Origin of Biotypes (Microbic Dissociation) in Pure Lines of Bacteria.—The experiments reported show that bacterial variability can be identified with the pleomorphic cycle. The strain studied was a bacillus that formed giant coccoids under certain conditions. The morphologic and staining changes occurring in these are indicative of biochemic reorganization that conditions variability in the strain. However, variability only occurs if the coccoids are transplanted to an environment that is selective enough to further the changes that are indicated by the pleomorphism itself. In this case the pleomorphic giant coccoids when transplanted at 20° C. grew after about two weeks, when usually they grow best at 37° in 24 to 48 hours. Under the former conditions a bacillary variant was produced instead of the original bacillus. The variant was a distinct type morphologically and culturally, although immunologically it agglutinated the antiserum for the original bacillus better than homologous strain itself did. The titre of the latter was 640, for the variant 1,280. The variant also absorbed all the agglutinins from the serum. This strain has been under observation for six years as a pure line culture, and is prone to form rudimentary branching forms as well as giant coccoids. The reorganization occurring in the giant coccoids made possible the dissociation of the branching phase as a distinct type. Pleomorphism for this strain is regarded as a true life cycle, and in reality represents potential variation. The biologic nature of the giant coccoids is shown in a subsequent study.—Ralph R. Mellon, *Proc. Soc. Exp. Biol. and Med.*, 20, 191, 1922.

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Diphtheria Carriers and Susceptibility: Carriers of Intestinal Diseases.—During the August training period at the Citizens' Military Training Camp at Camp Meade, Md., in 1922, a beginning was made to take advantage of the unusual opportunities for epidemiological surveys thus afforded. Cultures were made from the throats of 1,080 students and these were studied for the presence of virulent diphtheria bacilli. In 0.83 per cent of the cultures virulent diphtheria bacilli were found, indicating that nearly 1 per cent of the young men coming to the camp carried virulent diphtheria bacilli in their throats. The Schick test for susceptibility to diphtheria was made on 833 of the students, with the result that 55 per cent of them reacted positively, indicating the absence of antitoxic immunity. In spite of this high rate of susceptibility and the number of persons in close association with them carrying diphtheria bacilli in their throats, no clinical diphtheria developed during the training period. Among seven of those found to be carrying virulent diphtheria bacilli, three gave positive Schick tests; the others were immune. A study of specimens of feces from 750 of the students revealed parasites in 10, or 1.3 per cent. One of these, a young man from rural Virginia, was found to be a carrier of hookworm. The same 750 specimens of feces were studied culturally for the presence of members of the typhoid-paratyphoid-dysentery group of bacilli, but no evidence of a carrier or a member of this group was discovered.—P. F. McClure, M.D., and A. Parker Hitchins, M.D., *J. A. M. A.*, 80, 669, 1923.

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The Cause of the Explosion in Chocolate Candies.—The explosion of chocolate occurs from ten days to two weeks or longer after their manufacture. Anaerobic culture of the fondant from exploded chocolates showed organisms of the B. Sporogenes type. The dried egg albumen received in barrel quantities by the manufacturers was found to contain organisms of the B. Sporogenes type. The eggs are often contaminated in the nest by hen feces. The shells are not sterilized before breaking. The anaerobic culture of hen feces showed organisms of the B. Sporogenes type.—John Weinzirl, *Jr. of Bact.*, 7, 599, 1922.

Yeast-Like Bodies in the Blood of Human Beings.—A brief review is given of the literature dealing with yeasts and yeast-like bodies which have been associated with a number of diseases of human beings. Three cases were studied clinically and specimens obtained for study in the laboratory. A yeast-like organism was found in the blood of each patient examined and organisms were found in the patient's feces which were identical with the one found in the blood. Experiments show that rabbits are quite susceptible to this yeast-like organism, and they furnish valuable data inasmuch as the organism was found in their blood, as well as feces, following the animal's death. Cultures of the organism was fed by means of the stomach tubes. Sabourand's test media was employed for cul-maltose was used. Growth was rather slow, requiring from one to three weeks for the organism to develop in any quantities. The authors conclude that the number of cases is too small on which to base a correct opinion, but believe that the data is valuable enough to warrant further study.—Fleisher and Wackowick, *Am. Jr. of Trop. Med.*, 3, 59, 1923.

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Growth of Pfeiffer Bacillus in Mixed Culture in Blood-Free Medium.—The author reports the culture of a typical, indol-forming strain of the Pfeiffer bacillus for 52 successive generations in mixed culture with staphylococcus in a blood-free medium made of 2 per cent Armour's peptone and 0.5 per cent NaCl in tap water. This suggests that the growth accessory substances may be found outside of blood. The author used indol-production as an indicator of the presence of the Pfeiffer bacillus and terms it the "Pfeiffer presumptive test." An attempt to repeat the results with vegetable extracts alone failed.—Alan F. Reith, *Jr. Inf. Dis.*, 32, 243, 1923.

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Bacteriostatic Action of Dyes on Streptococcus Viridans and Pneumococci.—The authors attempt the study with the hope of finding some dye which could be used in a medium for the differentiation of the pneumococcus and streptococcus groups and with the object of determining the relation between chemical constitution and inhibitory power toward these organisms. Five strains of streptococcus viridans, the three type pneumococci and one type IV pneumococcus were used. They used Hiss serum-water veal infusion agar as a medium and 41 dyes were tested. According to their results organisms belonging to streptococcus viridans and pneumococci groups are inhibited by dyes to the same extent that it is therefore not feasible to use dyes for differential purposes. They also conclude that to have marked bacteriostatic action, a dye must contain three benzol rings and two or more amino groups in which the first atoms have been substituted by alkyl radicals. Acid dyes or salts of acid or basic dyes are practically inert.—John F. Norton and Gordon E. Davis, *Jr. Inf. Dis.*, 32, 220, 1923.

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The Preparation of Bacterial Antigens.—When preparing bacterial antigens, the author believes the following phases to be of utmost importance: First, the elimination of admixed culture medium proteins; second, the disintegration of the bacterial cells with a minimal chemical modification and a maximal liberation of their antigenic proteins; third, the conservation of antigens without the addition of chemical preservatives. Author worked with colon-typhoid group, employing a protein free artificial medium containing the following ingredients: Sodium chloride, asparagin, disodium hydrogen phosphate, magnesium sulphate, ammonium lactate and redistilled water. With this medium an antigen was obtained free from medium proteins. The disintegration of the bacterial cells with a view of bringing out a maximum of antigenic powers was accomplished by freezing and thawing. Finally, the preservation of the antigens was accomplished by keeping them at -18° C. By means of these procedures, author claims to have increased the essential antigenic proteins of the bacterial cells with a minimal modification of their chemical structure.—C. O. Melick, Ph.D., *Jr. Med. Research*, 43, 405, 1922.

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Cultures of Spirochetes in Mediums Containing Arsphenamine.—Krantz found that neo-arsphenamine did not inhibit the growth of spirochetes in Schereschensky's medium in concentration of 1:5000. This is twice as strong as that in the blood of a patient after administration of 0.5 grams of the drug.—*Munchener med. Wochenschrift*, 69, 1782, (1922). *J. A. M. A.*, 80, 735, 1923.

Blood Counts with Oxalated Blood Compared with Ordinary Counts.—The author made counts with oxalated blood from about 50 cases. The counts were found to compare favorably with the counts made in the usual manner, when the oxalated blood had been kept cold and was less than twenty-four hours old. The differential counts were not satisfactory, for the cells were broken, or disrupted so that it was impossible to study morphology. It was found that paraffined vials prevented the blood from collecting to sides of container.—Alvin A. Foord, *Jr. Lab. and Clin. Med.*, 8, 343, 1923.

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Loss of Sugar in Oxalated Blood.—The Folin Wu method (*Jr. Bio. Chem.*, 38. 81, 1919) of blood sugar determination was the one used. For the first part of the experiment, a portion of each specimen was deproteinized by the tungstic acid method immediately after being drawn. The sugar content of the filtrate thus obtained was taken as the standard for that specimen. Twenty specimens of human blood were tested after three hours, twenty after six hours, and twenty after twenty-four hours. For the second part of the experiment, the original filtrate was kept on ice and sugar determinations made on this after twenty-four hours. At the same time a new filtrate from the same specimens of blood was made and analyzed and the sugar contents of these two filtrates were compared with the original finding and with each other. The results of the experiment showed that the protein-free filtrate maintains a practically constant sugar percentage for at least thirty-six hours if kept on ice, or with the addition of a few drops of xylene if kept at room temperature. The protein, however, must be removed immediately after the blood is drawn.—Dora E. Bichard, *Jr. Lab. and Clin. Med.*, 8, 346, 1923.

✚

Types of Organisms Found in a Series of Tuberculous Children.—In a total of thirty cases of tuberculosis in children under the age of twelve years, the bovine organism was identified in ten instances. Twenty-two of the cases were known to be fatal. Of this number, the cases in which the point of infection was found in the alimentary tract proved to be, without exception, bovine in type. The authors designated all cultures virulent for rabbits as belonging to the "bovine" type and found the cultural characteristics distinctive. The "bovine" type showed the following characteristics: scanty or no growth on glycerin medium, moist and flat colonies which tended to become more confluent than the human types. J. Keith Jordan, M.D., and Elsie W. Brown, *Am. Jr. Dis. of Children*, 25, 234, 1923.

✚

Cerebrospinal Meningitis Due to Pseudomeningococcus.—Chevel observed in infants two cases of cerebrospinal meningitis due to diplococcus crassus and two to diplococcus siccus. These affections are very severe and their diagnosis can be made only by cultivation. Most of these pseudomeningococci are gram-negative and are agglutinated by the antimeningococcus B serum.—*Bulletine* de la Société Médicale des Hôpitaux, Paris, 46, 1742, (1922). *J. A. M. A.*, 80, 728, 1923.

✚

Agglutination for Typhoid in Cholelithiasis.—The author examined seventeen patients with cholelithiasis. Agglutination for typhoid was positive only in two cases and of dysentery bacilli in two, together with the agglutination of the colon bacillus.—*Schweizerische med. Wochenschrift*, 52, 1269, (1922). *J. A. M. A.*, 80, 729, 1923.

✚

The Detection and Identification of Maltose, Galactose, Saccharose, and Inulin by a Mycological Method.—An extension of the previously published method (C. A. 13, 28). A table shows the reaction of a number of bacteria and fungi with a great variety of carbohydrates. Fermentation tests with two suitable microörganisms is sufficient to establish the identity of any of the sugars named in the title.—Aldo Castellani and F. E. Taylor, *J. Trop. Med.*, 25, 41, (1922). *Chem. Abst.*, 17, 576, 1923.

PUBLIC HEALTH ADMINISTRATION

ALLEN W. FREEMAN, M.D.

Epidemic Jaundice.—Williams reviews the prevalence of epidemic jaundice in New York State during 1921-22, analyzing a total of 700 cases. The cases are almost evenly distributed between the two sexes, but the age distribution is quite characteristic. Fifty-one and seven-tenths per cent of all his cases occurred in the decade from five to fourteen years. Multiple cases were frequent; the maximum number of cases occurring in one home was eight. Three school epidemics are reported and a detailed analysis of symptoms of 700 cases is given. No conclusions are drawn in the article as to the causative factor of the epidemic, but there is no evidence that ratborne or other contamination of human food was of etiologic importance. Williams concludes that the disease was spread by droplet or contact infection from person to person.—*J. A. M. A.*, Feb. 24, 1923.

✦

Malta Fever.—Lake reviews the increasing use of goat's milk in infant feeding in the United States and calls attention to the importance of protection against the spread of Malta fever by this means. He describes the endemic center of Malta fever in the United States, located by Gentry and Ferenbaugh in 1911, and reports an epidemic of thirty cases at Phoenix, Arizona. He suggests the prohibition of the sale of goat's milk in cities where cow's milk is available, or in lieu of this prohibition, the pasteurization of all goat's milk.—*Public Health Reports*, Nov. 24, 1922.

✦

County Hospitals in Iowa.—Sampson describes the plan of the Iowa State Medical Society to stimulate the constituent county medical societies of that state to attack the problem of supplying efficient and equitably distributed medical service to the people of the state. A committee on field activities has been made a standing committee of the Iowa State Medical Society, and Dr. Sampson himself has been appointed field director. The plan as outlined involves the organization of county hospitals under the direction of the county medical society and the integration of these hospitals with public health, social, educational, and governmental agencies into a general program of preventive and curative medicine.—*Nation's Health*, Feb. 15, 1923.

✦

Typhoid Carriers in Illinois.—In an effort to prevent the recurrence of typhoid fever epidemics traced to carriers, and at the same time avoid the necessity and hardship of quarantining those demonstrated to be carriers, the State Department of Public Health of Illinois has drawn up a contract which all known carriers of typhoid fever will be required to sign and comply with in order to escape continuous quarantine. The contract simply constitutes a signed agreement to the effect that the carrier will practice the most rigid personal hygiene rules and will not engage in occupations that make the handling or preparation of food necessary. It further requires a semiannual report from the carrier to the department and a notice to the local health officer of any contemplated change in address. There are about thirty known typhoid carriers in the state at present, and eight of these have signed the contract. The others will be given an opportunity to sign as soon as is practical.—*J. A. M. A.*, Feb. 10, 1923.

✦

Poliomyelitis in Montana.—Sippy reviews the prevalence of poliomyelitis in Montana since 1915, and reports an epidemic of forty-two cases occurring in Yellowstone County, Montana, in 1922. He calls attention to the evidence of the existence of unrecognizable and abortive attacks of the disease and concludes that the disease is spread by contact with immune carriers, mild or abortive cases or unrecognizable cases, and tends to spread along the principal lines of travel. He believes that the distances between Montana cities afford some natural protection against the rapid spread of the disease and that the absence of large cities affords little opportunity for the acquisition of immunity by contact with mild infections. Detailed information is given regarding the

forty-two cases, many of which were treated with immune serum. He is unable to draw any conclusion as to the value of the serum, but concludes that its use is apparently without harmful results.—*Public Health Reports, Jan. 26, 1923.*

✚

Public Health Nursing in Toronto.—With a population of 530,000 and an area of 32 square miles, the city is divided into eight administrative districts. Six of the eight have their offices in police stations and two in rooms rented from social agencies. In charge of each district office is a whole-time medical officer, and his staff consists of a superintendent of nurses, a clerk, from 10 to 13 field nurses, from 3 to 5 dental assistants, 10 volunteer clinic assistants, and a variable number of pupil nurses. Each of the eight health districts is subdivided into a number of nursing subdistricts corresponding to the number of field nurses on the staff of the district. In these subdistricts each nurse is responsible for the whole nursing program.

Attached to the central office is a staff of special supervisors covering the various phases of public health nursing, who superintend the operation of these special phases in the district offices. The volunteer clinical assistants are separately organized with a superintendent and four captains, and a high standard of service by these volunteers is maintained.

Dr. Hastings gives most interesting details of the program of public health nursing and of the coöperative arrangements with the Victorian Order of Nurses who carry on a program of bedside nursing in Toronto. Close coöperative relations are also maintained between the Neighborhood Workers' Association, the social service agency of the city, and the health organization. The secretaries of the Neighborhood Workers' Association share the district offices of the health department. The importance of the noon lunch hour, during which the health and welfare workers of each district gather daily, is emphasized. The staff of the division of public health nursing in the Toronto Department of Health includes public health nurses 112, clerks 11, dental assistants 29, volunteer clinical assistants 85, and a variable number of student assistants. The health service represents one of the most complete departments of generalized public health nursing to be found in this country.—*Nation's Health*, Feb. 15, 1923.

✚

Simple Health Score for School Children.—Clark presents a plan for "follow-up" in school health work which involves the use of a health score chart. On this chart are enrolled the names of all children in the grade with an indication of the physical defects of each child. As these defects are corrected stars are placed in the appropriate boxes, and when all defects are corrected a gold star is placed opposite the name of the child. Children having only those defects which cannot be corrected are, under this plan, to be designated by two gold stars. An outline of the chart is given and also a proposed weight record chart, and tables of height and weight for boys and girls. No information is given as to the actual results of this procedure, and Clark does not mention the possible ill results to the individual child which may follow from a publication of a record of his physical defects.—*Public Health Reports*, Feb. 16, 1923.

✚

Hookworm in Antigua.—Sisco analyzes the results of the re-survey in the spring of 1922 of 1,234 persons in Antigua, British West Indies, who were presumably cured in a campaign against hookworm disease conducted in that island in 1915-17. Twenty-one and two-tenths per cent of these cases were found infected as against 16.3 per cent of a controlled group of 300 persons who were found not infected in the first survey. He concludes that treatment of cases of hookworm disease in heavily infected areas in advance of the installation of an efficient system of health administration is not productive of permanent results.—*J. A. M. A.*, Feb. 17, 1923.

✚

Malaria Prevention.—School children can be utilized by the epidemiologist and the health officer not only in estimating the amount of malaria in a community, but also at times to reveal the source of the anophelines responsible for their infection. A striking demonstration of this was made at Sao Paulo, Brazil, in one of the field surveys made by the Institute de Hygiene in

cooperation with the International Health Board. Malaria as disclosed by the children with enlarged spleens corresponded with dwellings near the river margin. The larval survey confirmed the indications obtained from the spleen examinations, since the propagation areas were found to coincide with the areas near the homes of the malaria-infected children.—Ascertaining the Splenic Index and the Mosquito Focus from the School Children (Samuel T. Darling), *J. A. M. A.*, 80:740–742, March 17, 1923.

✤

Tuberculosis Sanatorium Treatment Contrasted with Home Treatment.—The analysis of 4,067 histories of adults who commenced tuberculosis treatment during the five years 1914-18 seems to show, so far as comparison is possible, that patients in the early and intermediate stages of pulmonary tuberculosis who have undergone a course of sanatorium treatment, even for three or four months, fare appreciably better in health in later years than those who did not receive such form of treatment. Of 1,047 cases with negative or absent sputum 14.0 per cent of the sanatorium cases had died at the end of 1921 and 37.7 per cent of the non-sanatorium cases had died. Of the 1,263 cases with positive sputum, 61.2 per cent of the sanatorium cases had died at the end of 1921 and 81.3 per cent of the non-sanatorium cases. If the sanatorium treatment and home treatment groups were really scientifically comparable, it would appear that in certain age groups of positive cases sanatorium treatment, merely regarded from the point of prolongation of life, is not much better than home treatment.—G. Lissant Cox, *Brit. J. Tuberc.*, 17:27-30, Jan., 1923.

✤

The Medical Research Council.—The *Annual Report* of the Medical Research Council for the year ending September 30, 1922, has appeared. The grant-in-aid at the disposal of the council during the current financial year was 130,000 pounds, the same as in the preceding year. In this amount was again included the cost of the work of the Industrial Fatigue Research Board and of the research work into mental disorders done on behalf of the Board of Control for England and Wales, and certain pathological inquiries conducted in Scotland.

In the Department of Statistics, Dr. Brownlee has been engaged in preparing an account of the data necessary for the statistical study of immunity and in investigating the relation of scarlet fever to rainfall. In addition, the statistics of births and deaths, with special regard to the effects which the falling birth rate may be expected to produce have been studied. Dr. Young has worked upon the data of the statistics of epidemic infantile diarrhoea and has extended the investigation to several towns in the provinces and abroad.

Under the heading of Prenatal Studies, the factors contributing to dead births and premature births have been examined by a large number of workers. Under Postnatal Studies the influence of various factors on nutrition and growth was investigated under the auspices of the Scottish Child Life Committee.

Many other investigations are being conducted in other branches of biochemistry, physiology and pathology.

✤

Rocky Mountain Spotted Fever.—Rocky Mountain spotted fever has been for the past twenty years the subject of study by various workers, including members of the United States Public Health Service. The following results are reported from the laboratories of the Rockefeller Institute for Medical Research:

A potent immune serum against the virus of Rocky Mountain spotted fever can be produced in the rabbit. When given within the period of incubation the suppression of the infection is assured, but after the onset the serum has no beneficial effect.—Immunity Studies of Rocky Mountain Spotted Fever. I. Usefulness of Immune Serum in Suppressing and Impending Infection (Hideyo Noguchi), *J. Exper. Med.*, 37:383–394, March 1, 1923.

✤

The Care and Feeding of Infants.—This is a series of articles in the January numbers of the *Journal of the American Medical Association* on the care and feeding of infants, addressed to the general practitioner rather than to the pediatric specialist. It is contemplated that the series of articles when completed will be printed, somewhat elaborated, in book form.

VITAL STATISTICS

LOUIS I. DUBLIN, Ph.D.

U. S. Provisional Birth and Death Figures, 1922.—According to provisional statistics compiled by the Census Bureau of the Department of Commerce, the birth rate declined and the death rate increased during the last nine months of 1922. The mortality rate ranged from 7.8 in Idaho to 14.3 in Maine, and averaged 11.7 in the states from which statistics were taken for each thousand of population in the period, as compared with an average of 11.6 during the first nine months of 1921. The birth rate ranged from 18.3 in Washington to 30 in North Carolina, and averaged 22.8 in the first nine months of 1922, as compared with an average of 25 in the same period in 1921. —*Department of Commerce*, Washington, D. C., March 5, 1923.

✤

The Registrar-General's Statistical Review of England and Wales for the Year 1921. New Annual Series No. 1, Tables, Part 1, Medical.—This volume forms part of the annual series of statistical publications which, under the style of the Registrar-General's *Statistical Review*, will take the place of the Registrar-General's *Annual Report*. An endeavor has been made to regroup the statistical matter according to the distinctive character of its interest into (1) medical statistics, (2) civil statistics. Each section will be issued when it is ready. The present volume consists primarily of those tables contained in the old series which have a medical interest, suitably rearranged. The annual figures of the Notifications of Infectious Diseases, hitherto separately published, are now included, following the course already adopted in connection with the Registrar-General's Weekly and Quarterly Returns.

The crude death-rates 12.1 for persons (13.0 for males and 11.3 for females) per 1,000 living at all ages, are the lowest ever recorded since civil registration was instituted in 1837. The standardized death rate (11.5) is also the lowest recorded. Twelve per cent of the total deaths are ascribed to heart disease. Cancer is responsible for a little more than 10 per cent; tuberculosis (all forms), 9 per cent; pneumonia, nearly 8 per cent; bronchitis, over 7 per cent. The rate per million living of deaths from tuberculosis (all forms) was 1,127, the lowest in the 11-year table shown, as were the rates for deaths from bronchitis and pneumonia. The cancer rate showed a slight increase. Infant mortality was 83 per 1,000 births, the lowest rate yet recorded, except in 1920, when it fell to 80. This rate is 25 per 1,000 lower than the average infant mortality rate of the five pre-war years.

Among the cases of infectious diseases notified during the year, scarlet fever was most prominent; tuberculosis came next, and diphtheria third. There were 315 cases of smallpox notified, of which 106 occurred in Nottingham and only 2 in London.

✤

Vital Statistics of Scotland, 1921.—The birth rate was 25.23 per 1,000 in 1921, which is slightly lower than the birth rate in the antebellum years. The death rate, 13.56, is the lowest recorded in any year since 1861. The previous minimum rate was 14.45, which occurred in 1917. The infantile mortality rate of the year was 90.3, the lowest yet recorded. The previous lowest rate was 92.0, which occurred in 1920. Among causes of death found to be more than usually prevalent are smallpox and cancer. The death rate from cancer, 122 per 100,000, is higher than that due to any other cause of death with the exception of heart disease. It exceeds that from phthisis by fully 50 per cent. Deaths from smallpox number 24. This number, though markedly less than that in the previous year, when it was 152, is more than in all years 1905 to 1919.

The most outstanding feature of the vaccination statistics of the year 1920 is the increasing proportion of successful vaccinations. Of all children in 1920 and surviving at the time of statutory vaccination, 70.5 per cent are known to have been successfully vaccinated, as against 54.5 in 1918 and 58.0 in 1919. Appendix IV gives the new international classifications of causes of death in 1921 in parallel columns in comparison with the corresponding classification of 1911.—Sixty-seventh *Annual Report* of the Registrar-General for Scotland, 1921.

Birth Rate in **France.**—During 1922 the number of births in the large cities of France decreased by 9 per cent from the number for 1921. If a similar rate of decrease maintains in the provinces, there will have been 70,000 fewer births in France this year than last year. The number of births in ten large cities of France in 1922 was 71,256, as compared with 78,167 in 1921.—*Eugenical News* (Reginald Gordon Harris), 8:14, Feb., 1923.

✤

Low Records in **Communicable Disease** in New York in 1922.—Comparing 1922 with 1921, there were declines last year both in the number of cases and in the number of deaths for most of the important communicable diseases, including typhoid fever, diphtheria, scarlet fever, measles, whooping cough, infantile paralysis, smallpox, and cerebrospinal meningitis. The number of cases of chickenpox and German measles also declined. On the other hand, pneumonia and influenza were materially higher in 1922 than in 1921, though lower than in any other year since 1917. The absolute number of cases of typhoid fever is the lowest ever reported in the history of the state. The diphtheria death rate stood at 12.0 per 1,000 for the year 1922, as compared with 16.9 in 1921. The measles rate was the lowest in fifteen years, excepting only 1918. Scarlet fever was still very high, about 30 per cent above the average for the five years 1917-1921. Less than half the number of smallpox cases were reported in 1921. The 1922 record in infantile paralysis was better than in 1921, but this disease was more prevalent than in any other year since 1916.—State of New York, Department of Health, *Health News Service*, March 19, 1923.

✤

Birth, Death, and **Infant Mortality Rates** in New York State for 1922.—The provisional death rate for the entire state last year was exactly 13, as compared with 12.3 in 1921. The birth rate was 21.6, as compared with 22.8 in 1921. The infant mortality rate stood at 77 deaths for every 1,000 children born alive. New York City showed a lower infant mortality rate, 75 per 1,000 births, than the remainder of the state, which average 81. Among the cities the lowest death rate was in Lackawanna, 8.8, and the highest Ogdensburg, 31.8. New York City again showed a low death rate, 11.9, falling below the average of 13 for the state and well below the figure of 14.2 for all parts of the state outside of New York City.

Birth rates ranged from 32.6 in Canandaigua to 11.9 in Rensselaer. Canandaigua, New Rochelle, Ossining, White Plains, and Glens Falls exhibited the lowest infant mortality rates. The highest infant mortality was found in Ogdensburg, 148.—New York State Department of Health, *Health News Service*, Feb. 21, 1922.

✤

Russian Epidemiologists in Conference.—The sixth All-Russian Congress of Bacteriologists and Epidemiologists was held at Moscow last May. A good account of the conference is now given by Prof. P. Muhlens of Hamburg in the *Archiv für Schiffs und Tropen-Hygiene* (xxvi, 8). Typhus, which had been decreasing, began to spread itself more widely as soon as the famine conditions became acute in the winter of 1921. It was most prevalent in the Volga provinces, and spread chiefly from the hospitals and along the lines of the railways, whose staffs suffered heavily, and particularly the doctors. Relapsing fever in Russia is often associated, in a novel syndrome, with a paratyphoid fever. This syndrome has a 50 per cent mortality, and is reported also from Poland, Rumania, and Asia Minor. The congress was very anxious about the widening of the area in which malaria has become endemic, extending farther and farther to the north. Leprosy was spreading so extensively that leper colonies are required, with accurate registers of patients and with schools and hospitals. Three thousand cases of cholera had appeared before the middle of May, three times as many as in 1921. The final resolution asserted that the famine area was far larger than the official reports admitted; that the famine was a chief cause of the prevalence of the epidemics, and that the assistance for the distressed obtainable within Russia herself was quite insufficient for her needs.—*Lancet*, 1:147, Jan. 20, 1923.

✤

Public Health in Boston, 1922.—The birth rate per 1,000 population in Boston in 1922 was 24.28, which was slightly below the rate

for 1921, 25.6. The death rate per 1,000 population was 14.95 in 1922, as compared with 13.5 in 1921. The infant mortality rate, 92.71, was the lowest on record with the exception of the year 1921, when a rate of 77.3 was established. Deaths from pulmonary tuberculosis in 1922 were the lowest on record in the department. There was a notable decrease in the deaths from alcoholism. Deaths from cancer and heart disease also increased.—*Monthly Bulletin*, Health Department, City of Boston, Jan., 1923.

✚

Revised Mortality Summary of Chicago, 1922.—The death rate last year, 11.18, is, with the exception of the preceding year, the lowest on record. Of the acute infections there were decreases in scarlet fever, whooping cough, and diphtheria, with moderate increases in influenza, measles, and smallpox. Tuberculosis showed a decrease of 4.5 per cent. Deaths from pneumonia recorded a sharp advance and nephritis a moderate increase, with cancer marching steadily onward. The greatest increase and the greatest single cause of death was attributed to organic heart disease, which caused 17 per cent—nearly one-sixth of all deaths.—*Bulletin* Chicago School of Sanitary Instruction, Feb. 24, 1923.

✚

Typhoid in the Large Cities of the United States in 1922.—The eleventh annual survey of typhoid fever mortality in the cities of the United States having more than 100,000 population, of which there were 69 in 1920, is presented. The year 1922 marks the lowest point yet reached in the typhoid record of the large cities of the United States. The slight check that occurred in 1921 to the almost steady decline of twelve years has been followed by a further decrease. Compared with 1921, 46 cities showed a diminished and only 23 an increased typhoid rate. As has been the case since 1920, every one of the 12 largest cities of more than 500,000 population had a typhoid death rate under 10, and, as in 1920 also, all but one had a rate under 5. Eighteen cities had a rate under 2.0. Three cities, New Bedford, Providence, and Yonkers, reported no deaths. Only five cities had a rate over 10, as compared with 19 as late as 1917. Southern cities shared in this typhoid decrease along with the cities in the northern states.—*J. A. M. A.*, 80:691-694, March 10, 1923.

✚

Homicides in American and Canadian Cities.—The rates of ten Canadian cities with a total population of 2,095,000 in 1921 are compared with the corresponding rates for 28 American cities which in 1921 had a total population of 20,588,000. The average homicide rate for Canadian cities is shown to have been 1.7 per 100,000, while for American cities the average rate was 8.8. The highest rate on record for Canadian cities occurred in the year 1915, when it reached 2.3 per 100,000, while the highest rate for American cities occurred in 1921, when it attained to 9.3. Among the Canadian cities the rates ranged from 0.3 for Quebec to 3.8 for Vancouver. The range for American cities during the same year was from 1.4 for Hartford to 56.8 for Memphis.—Frederick L. Hoffman, *Spectator* 110:3, March 8, 1923.

✚

Epidemiologic Survey in a Citizens' Military Training Camp.—During the August training period of the Citizens' Military Training Camp at Camp Meade, Maryland, in 1922, a beginning was made to take advantage of the unusual opportunities for epidemiologic surveys thus afforded. Cultures were made from the throats of 1,080 students and virulent diphtheria bacilli were found in nearly 1 per cent. Fifty-five per cent tested reacted positively to the Schick test. Parasites were found in 1.3 per cent of the feces from 750 students.—P. F. McGuire and A. Parker Hitchens, *J. A. M. A.* 80:665-670, March 10, 1923.

✚

New York

According to reports made to the Division of Communicable Diseases of the State Department of Health, 308 cases of encephalitis lethargica developed in New York State during February of this year, which is more than in any other month during the last two years. With the exception of February, 1921, the month of February this year also shows the highest record for cases of this disease in up-state New York.

INDUSTRIAL HYGIENE AND OCCUPATIONAL DISEASES

DRS. E. R. HAYHURST and N. C. DYSART

Records of Lost Time in Industry.—The value of sickness records, their intimate relationship to the study of lost time in industry and to a large measure their dependency on preventable causes are brought out. Although ordinarily a sickness frequency rate 50 per cent greater among females than among males can be expected, at least as regards cases lasting eight days or longer, a tabulation of cases in a public utility company employing 2,600 men and 400 women demonstrated that such had no bearing on their morbidity rates. The rate for the men employees was 46 per cent above the average rate for males, and the rate for the women employees was 70 per cent above the average rate for females. The diseases that cause these high rates were of respiratory character, which occurred 110 per cent oftener among the men and 142 per cent oftener among the women than would be expected taking average rates as criteria. Not one respiratory disease alone but all respiratory illnesses except pneumonia were present oftener than the average frequency. The health hazards in this plant were (1) sudden variations in temperature; (2) dampness; (3) inorganic dust; (4) acrolein; (5) amyl acetate; (6) benzine; (7) lead; (8) methyl alcohol; (9) sulphuric acid; and (10) turpentine. Of these hazards, all except lead are known to cause irritation to the respiratory organs. The sickness rates in this company constitute a challenge and indicate the opportunity in disease prevention work. The measures used for control of the hazards above mentioned, if any such control was attempted, were both inefficient and inadequate.—L. R. Thompson and D. K. Brundage, *Nation's Health*, Vol. V, No. 2, Feb. 15, 1923, p. 99.

✚

How Long Does Basophilia Persist After Lead Poisoning?—After the ingestion of lead has ceased, two important diagnostic signs, lead in the urine and basophilia apparently disappear about the same time. In a mild case of poisoning basophilia was seen 52 days after the last ingestion of lead, and half a pint of morning urine gave a trace of lead. In a more severe case of painters' colic erythroblasts were found 39 days after leaving work, but a sample of eight ounces of urine gave no result. On the fiftieth day there were easily found unequal sized cells, polychromasia and punctate basophilia, Cabot rings and one punctated erythroblast. The whole twenty-four hours' urine was collected for the same day and gave a trace of lead.—R. Craik, *British Medical Journal*, No. 3238, January 20, 1923, p. 103.

✚

Occupational Sensitization to Organic Dusts.—That exposure to organic dust in industries may cause an acquired sensitiveness was demonstrated in the case of a chemist who acquired in the course of his occupation a sensitiveness to the dust of the castor bean. This was characterized by attacks of sneezing, and of asthma. The slightest inhalation of the powder of fat-free meal brought on severe attacks. Cutaneous tests were performed and the fat-free castor meal produced an urticarial wheal at the site of a superficial scratch on the forearm. A cutaneous reaction was obtained with a drop of the protein solution of the meal in a dilution of 1:250,000. Symptoms of protein intoxication result from the absorption of extract of the castor meal from skin abrasions. The presumptive evidence indicates that the globulin fraction possesses antigenic properties. In cases where an acquired occupational sensitiveness is suspected, cutaneous testing is of value in diagnosis and treatment.—H. S. Bernton, *Amer. Jour. Med. Sciences*, Vol. CLXX, No. 2, No. 611, February, 1923, p. 196.

✚

Solvents in the Rubber Industry.—From a health standpoint the desirability of solvents in relative order are in descending order: (1) solvent naphtha; (2) 50 per cent benzol; (3) 90 per cent benzol; (4) pure benzol. The old theory that the purer the benzol the less toxic the effect does not hold good to-day. Pure benzol permits of more rapid work in cementing, but is much more toxic than the

weaker grades because it is light and volatilizes rapidly, and thus a larger dose is breathed by employees exposed to it. Many other cases of poisoning reported in the rubber industry are believed to have been due to pure benzol. Absorption of benzol is through the respiratory apparatus and the skin. Females seem to be more susceptible than males, and vigorous muscular individuals with rapid circulation and deep breathing are overcome by benzol fumes most readily. Poisoning is more likely to occur on hot, humid days, or in interiors where the air is hot and stagnant, because of the greater volatility of the benzol under these conditions.—Report of Committee on Health Hazards, Rubber Section, *Proceedings of the National Safety Council*, 1922, p. 893.

✦

Prevention of Phthisis.—On the assumption that the elimination of dust by constant cleanliness would prevent printers' phthisis, a vacuum-cleaning plant, with pipes carried to every floor, having a central exhaust engine with dust containers in the basement, was installed in the Printing Department of the Bank of England, in the autumn of 1920. The apparatus has been continually and systematically used over all floors, walls and furniture by an especially trained staff. Morbidity rates have been compared with those of another new factory near London, which was engaged in similar work, but in which such cleaners had not been instituted. The observations cover a period of two years. Throughout the whole two years in the Printing Department in which the cleaning apparatus was employed no new cases of the disease have been noted, while in the other new factory five fresh cases were reported, one of which has since proved fatal. Previous to the installation of the cleaning plant phthisis had occurred in the Printing Department of the bank as in other printing works. The conclusion is that phthisis may be prevented in certain printing shops if preventive measures are taken. If it can be prevented among printers, it surely can be reduced elsewhere. The constant, systematic elimination of dust should lead to the curtailment not only of consumption, but of many minor illnesses.—E. H. Ross, *London* (England) *Times*, January 26, 1923.

Accident Statistics in the Rubber Industry.—In order to compare the frequency and severity rates of accident experience in the rubber industry with the rates for other industries, and to compare the rates of members within the industry, tabulations were made, with standard rules and standard charts by ten companies operating forty-two factories.

The severity rate for all factories reporting shows an equivalent of .65 days lost for each 1,000 hours worked. Figuring that there are 300 working days of eight hours each in a year, this would show a lost time equivalent of 1.57 days for each man working a full year. Seven of the ten companies reporting had a lower severity rate than the average of .65.

Analyzing the frequency rate we find that the companies reporting employing approximately 28,000 men worked a total of 35,592,000 hours during the first six months of 1921 and experienced 884 lost time accidents, which gives a frequency rate of 24.8 accidents for each million hours worked. This means that one man out of every seventeen employed would be injured in the course of a year.

Combining the frequency rate and the severity rate, if all of the time lost is divided among the injured men, one man out of every seventeen would lose 26.4 days during the year due to accidents.—R. N. Watson, Rubber Section. *Proceedings of the National Safety Council*, 1921, p. 683.

✦

The Scope of the Problem of Industrial Hygiene.—Industry has been growing more complicated and more dangerous, especially since the war. In the United States the fields which have been pretty well surveyed are certain of the poisons and a few of the dusts. High average sickness rates and death rates are common among textile workers, but we have no proof that dusts are the cause. Siliceous dusts, as granite and flint, are especially harmful. Softer stone, as marble and sandstone, has less effect. The dust of Indiana limestone, Portland cement, and of soapstone, do not seem to be harmful to the lungs; perhaps they are caught in the saliva and swallowed. We do not yet know what forms of organic dust do harm. The dust of jute seems to be comparatively harmless. While there is

no apparent evidence that manganese dust causes injury to the lungs, when the influenza epidemic came there was a very excessive death rate from pneumonia among people exposed to manganese dust.

During the war, and since, new trade poisons have been increasing. The coal tar solvents, as benzol, are cheaper than those used previous to 1914, but infinitely more dangerous. The use of benzol has enormously increased in the rubber, shoe and dry cleaning industries, and in the making of varnishes, shellac, and paint removers. While lead, mercury and carbon monoxide are more or less familiar to us, arseniureted hydrogen poisoning is a less familiar form and may occur whenever such a metal as iron or zinc, contaminated with arsenic, is in contact with a heavy acid. Results of extensive studies in the field of industrial fatigue have not been satisfactory. Definite answers have not been found to such questions as, "How long can I work men and women without injuring them?"—Alice Hamilton, *U. S. Public Health Reports*, Vol. 37, No. 42, October 20, 1922, p. 2604.

✚

Air Conditions in the Factory.—Not only better health and comfort, but also greatly increased efficiency, follow upon the provision of good ventilation in factories and offices. Symptoms resulting from vitiated air are loss of appetite and energy, discomfort and headache. The debility caused by vitiated air makes the individual exceedingly liable to infection, and with adequate ventilation the chance of contagion is lessened to a great extent. Vitiation of room air results from (1) the presence of human beings, consuming oxygen and giving off carbon dioxide; (2) the use of open lights or fires; (3) dust from the walls and floors and from outdoors, and (4) dust and fumes from manufacturing processes. Proper temperature and degree of humidity are also very important. In securing an effective system of ventilation either in an old building or in a new structure, the services of an expert engineer are often a real economy in the end. The article sets forth the experience of managers and other officials of several important factories in relation to the solutions of their problems of air conditioning.—*National Safety News*, Vol. 7, No. 3, March, 1923, p. 33.

Fatal Poisoning from Phosgene ($COCl_2$).—The author summarizes his observations as follows: (1) Exposure to phosgene, like exposure to nitrous fumes, does not give immediate warning of the grave consequences which may supervene within twenty-four hours. (2) Phosgene does not act as a direct lethal agent, but as a powerful irritant to the air passages, setting up profuse exudation and cellular desquamation which obstruct the terminal bronchioles. (3) The irritation also causes contraction of the bronchial muscles, associated with asthmatic symptoms. (4) Finally, the bronchioles become so firmly plugged that the entry of air into the alveoli becomes impossible; death then results. (5) Treatment should be directed to the reduction of the exudation and muscular spasm, and to increasing the value of the inspired air by the administration of oxygen.—S. Delépine, *Jour. of Industrial Hygiene*, Vol. IV, No. 10, February, 1923, p. 433.

✚

Carbon Monoxide Asphyxia—The Problem of Resuscitation.—The authors sent a questionnaire to a number of the large gas companies of the country concerning the methods which they used in resuscitation from gassing and their experience in the use of the lung motor, pulmotor, and similar devices. It was found that seven firms employ the Schäfer prone pressure method alone. Three employ the lung motor and eight the pulmotor (two of these firms using both instruments). Of those using the prone pressure method, three have discarded mechanical devices for artificial respiration. One company reports that in most cases the patients are breathing when first seen and that a large percentage are unconscious. When brought to hospitals, 59.8 per cent were unconscious on admission or when found; 44.4 per cent were breathing rapidly and only rarely was breathing very slow; the pulse rate was high, averaging 104 for the entire series; 6.4 per cent were frothing at the mouth; 17.4 per cent had râles in the lungs, and 4.5 per cent had pulmonary edema. After first aid treatment, the death rate was 14.5 per cent. Cases showed a high average pulse rate. A group of 27.8 per cent of the total number studied had undue moisture in the lungs. The conclusions are as follows: (1)

No evidence has been obtained from representative gas companies which indicates that either the lung motor or the pulmotor is superior to the manual prone pressure method of artificial respiration. (2) The evidence obtained leads to the conclusion that if apparatus is to be employed to supplement this simple method of artificial respiration, it should be in the form of some device to provide inhalation of oxygen and carbon dioxide as recommended by Henderson and Haggard. (3) Evidence gathered from hospital records indicates that in gas poisoning any method of artificial respiration which drives air by positive pressure into the lungs may be a source of danger to the patients treated. Devices such as the pulmotor and lung motor operate in this way, and consequently would seem to require further investigation before being recommended for use in gas poisoning. (4) Owing to the fact that other physiological factors enter the problem of artificial respiration in gassing, the Commission has undertaken a series of experiments upon further phases of the problem and will offer final recommendations at a later date. At the present time the best directions for rescue crews are those already given by Henderson and Haggard—namely, immediate use of the Schäfer prone pressure method of artificial respiration in non-breathing cases, supplemented as soon as possible by oxygen carbon-dioxide inhalations given through a suitable inhaling device.—Drinker, Cecil K., and Cannon, Walter B., Report II of the Commission on Resuscitation, etc., *Jr. ind. Hyg.*, IV, No. 11, March, 1923, p. 463.

✦

Specifications for Safety.—This is No. 53 of the series of Safe Practices Pamphlets and covers both checking plans and general specifications for safety. Section XVIII, Exhaust System, presents the following code: A.—Catch dust and fumes at source and not permit handling of materials in the open, or handling poisonous substances unnecessarily. B.—Design of hoods. C.—Size and layout of pipes; avoidance of sharp bends. D.—Size of fan. E.—Collector or trap at discharge. F.—Discharge outside of workroom and where no nuisance created. G.—Protection against static or other sparks if combustible dust handled. H.—Use of separate room or building for dangerous processes. I.—Provision for testing system.—*National Safety News*, 168 N. Michigan Ave., Chicago, February, 1923, p. 47.

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Conference Board of Physicians in Industry.—Among the subjects discussed at the 36th meeting held January 20, 1923, was that of industrial medical records and X-ray examinations.

In the experience of the members, in many cases extending over a period of ten or twelve years, it had been found that records kept by the medical departments were of much value to the organization. An instance of the value of these records was cited in their use for reëmployment of workers who had been dropped during the industrial depression. In many cases the records showed the defects of workers without the necessity of a second physical examination. Another use of these records was shown in the checking up of the physical condition of those workers who had been absent on account of illness. In one instance a close study had been made of 100 workers who had been sent away for the treatment of tuberculosis. Their attendance record after recovery and return to work was much better than that of a similar group of workers not so affected. This experience shows that the tubercular workers had learned how to take care of their health while the supposedly well person paid little attention to this important matter.

A report was submitted upon the X-ray examination of the chests of over 3000 employees in one factory. By refinements of technique, it had been possible to make these exposures at the rate of about one per minute. A specially devised caliper was shown for measuring the depth of the chest, thus enabling a more accurate exposure. The result of this study showed that 3.7 per cent of those examined had positive or suspicious symptoms of pulmonary tuberculosis, 3.2 per cent showed abnormalities of the heart or aortic arch and .8 per cent showed miscellaneous chest abnormalities; a total of 7.7 per cent of those examined having some abnormality of the chest.

FOOD AND DRUGS

C. L. ALSBERG, M.D.

Ramassage et utilisation des dechets et residus pour l'alimentation de l'homme et des animaux pour les engrais et les industries agricoles (1914-1920).—The monograph under consideration in this review aims to bring together all the material that was accumulated during the war upon the general subject of waste and by-products that might be of service in the feeding of men and animals, in the production of fertilizers, and in the agricultural industry generally. It brings together in convenient form abstracts of all that mass of literature which grew up during the war in connection with the effort to intensify agricultural production, to find substitutes for all kinds of materials, to utilize products not theretofore utilized, and to develop new raw materials. It is a mine of information on these subjects. It also contains a discussion of the laws and administrative procedures adopted in order to increase the utilization of waste and by-products for food for man and animals and also for the production of fertilizers and of leather, textiles, and the like. The book represents an extremely valuable record of abnormal agricultural and industrial conditions from which much can no doubt be learned that will be of use in normal times.

This book is a publication of the International Institute of Agriculture at Rome, an institution founded by a Californian, David Lubin, with the assistance of the King of Italy. It is perhaps the only international organization which survived the shock of the great war and is supported by most of the civilized governments of the world, many of whom send representatives to the institute at Rome. It acts as a clearing house for all information bearing upon agriculture. Its publications deal in the main with statistics of agricultural production, distribution, and consumption, and with literature of plant pathology and the like.—Prof. Arturo Bruttini, *Imprimerie de l'Institut International d'Agriculture*, Rome, 1922.

Canned Spinach as a Source of Botulism.—The Microbiological Laboratory of the U. S. Bureau of Chemistry examined more than 650 cans of spinach from a pack in which there were a few cans that had caused botulism. In this series cans found free from evidence of spoilage, as determined by inspection, were free from evidence of bacterial activity, as determined by culture. In so far as the samples received from commercial sources were concerned, inspection by persons familiar with canned spinach was found to be a safe basis for passing or condemning these samples. However, in cans which had been inoculated with the organism for experimental purposes, certain cans were found to have reached a stage of toxin formation sufficient to kill guinea pigs before gas or odor or both had developed sufficiently to make possible their removal by inspection. Moreover, bacillus botulinus acting alone does not disintegrate plant tissues, although it does swell the can when development has become pronounced. The authors therefore conclude that the appearance of an occasional can in which toxicity has reached the danger point before gas or swell is detected is clearly a possibility in dealing with spinach. Inspection alone is therefore inadequate to avoid danger from such cans. Hence, in addition to careful inspection before opening, the contents of cans of spinach should always be actually recooked before serving.

Certain recommendations are made for the guidance of managers of spinach canneries which it is believed will lessen the danger that an occasional spoiled can may reach the consumer. Spinach is sometimes handled in large quantities and held in car lots for some time. Under these circumstances the whole mass will sometimes heat, become "steamy," and have a foul odor. Spinach showing only a minor contamination at the start would be grossly contaminated at the end of such a holding period. Even under better conditions respiration in such masses will produce some heat and an atmosphere largely of carbon dioxide, with abundant transpired moisture, thus creating conditions favoring anaerobic decomposition. Spinach therefore requires most careful sorting, washing, and packing,

with ample brine to insure conditions as favorable as possible for sterilization. It is further recommended that spinach canning factories segregate the different lots packed and give them batch numbers by which they may be recognized long after canning. If this is not done, it is recommended that each batch, as canned, be stacked in the warehouse separately, so as to remain unmixed with other batches. If this is done, then the cans may be stored and watched for some time for the development of swells. Any batch that develops swells should be reprocessed after the removal of all swelled cans. It is further recommended that spinach be canned with plenty of liquid so as to facilitate heat penetration by convection.—Ruth B. Edmondson, Charles Thom, and L. T. Giltner, *The American Food Journal*, Jan., 1923, p. 33.

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A Study of the Preservation of Fish in Ice.—Commercial shipping experiments were made upon fish shipped in the dry cooled condition and in ice in barrels and in shallow boxes. The difference in keeping quality between whole fish and fish that had been gutted was also investigated. Sea trout and mullet stored in ice kept in marketable condition for about five days longer than Spanish mackerel. The mullet only appeared to be improved in keeping quality by gutting. This difference between different species of fish is apparently due to the differences in the kind of food they take into their intestinal tracts. Regardless of species, the round fish which were full of feed spoiled more quickly than the corresponding gutted fish. The weight of the fish first increased, due to absorption of the water from the melting ice; then decreased, a net loss usually occurring in the fish in the bottom layers of the container. A loss in the mineral and organic constituents during the longer period, particularly in the case of gutted fish, was indicated. The results do not justify the recommendation of a change in the commercial practice of gutting most species, but illustrate the advantage of a shallow container like a box over a tall container like a barrel as shipping packages for iced fish.—L. H. Almy, E. Field, and H. R. Hill, *American Food Journal*, Jan., 1923, p. 36.

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CHILD HYGIENE

TALIAFERRO CLARK, M.D.

Associated Out-Patient Clinics of New York City.—The Section of Pediatrics of the Associated Out-Patient Clinics of New York, including a representative of the professional staff of each of thirty-seven pediatric clinics of the city, has, through its Executive Committee,[1] been actively engaged in working out plans for aiding and improving out-patient service in pediatrics. The section agreed that the professional staffs and governing authorities of the pediatric clinics would be stimulated by the existence of an approved standard, and by comparison of existing clinics with this standard. As a first step towards this end, requirements for an out-patient service in pediatrics were formulated.

These requirements were submitted in their first draft to various interested individuals for criticism, and after revision were finally adopted by the section, and later authorized by the association. The standards are published in the current number of the *Archives of Pediatrics*.[2] They are not regarded as in any sense complete or final, but as a working basis.

During the summer of 1922 the member pediatric clinics were visited, and their organization and methods compared with these standards. The survey showed that several clinics in New York City closely approximate the standards set by the section; that others are conducting pediatric

1. Executive Committee: Roger H. Dennett, M.D., chairman; William P. St. Lawrence, M.D., vice-chairman; Murray H. Bass, M.D., Stafford McLean, M.D., Marshall C. Pease, Jr., M.D., Mark S. Reuben, M.D., Frank Howard Richardson, M.D., Louis C. Schroeder, M.D., Charles Hendee Smith, M.D., Gertrude E. Sturges, M.D., executive secretary.

2. Reprints are available on application to the Associated Out-Patient Clinics, 17 West 43rd Street, New York City.

out-patient service of a superior grade; but that many clinics have unsolved problems of organization and management, and that some fail to meet essential requirements. When informed just how their clinic work compared with these standards, both medical and administrative, authorities of the institutions visited were usually much interested, and plans for improving service are already under way in several institutions.

The section also decided to select one institution in which could be demonstrated well-rounded service in pediatrics; and after a study of the various clinics of New York, because of the excellence of its out-patient department, the Children's Medical Division of Bellevue Hospital was chosen.

At Bellevue a demonstration of complete unity between the in-patient and out-patient service will be made possible by improvement of record transfer between ward and out-patient department. Through the employment of a part-time admitting physician, improved methods of admission and distribution of patients (especially the control of contagious disease) will also be worked out. An appropriation from the Committee on Dispensary Development of the United Hospital Fund has been made to meet extra expenses involved in the clinic for this year. The demonstrations at Bellevue began February 1st, and its results will be closely followed by the section during the year.

The Executive Committee are also working on a plan for the study of results in pediatric out-patient service, and are at present trying out a tentative plan of study in three representative clinics. Their aim is self-analysis, to determine to what extent the clinic work is not effective, why, and how its effectiveness can best be tested at periodic intervals. Further reports of the demonstration at Bellevue and the plan for studying results will be published from time to time so that the work may be of value to those interested in pediatric out-patient service.

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Accidents of Pregnancy.—The average number of stillbirths was 2 to each 100 pregnancies and the number of miscarriages approximately 1 in 9 pregnancies in a total of 9,985 pregnancies occurring in 3,512 middle-class families in Indiana. The percentage of mother deaths in this group was only 1 in 1,250, the highest percentage occurring in one-child families.—*Monthly Bulletin Indiana State Board of Health*, Feb., 1923.

✦

Causes of Malnutrition.—In an intensive study of 430 children, the following estimated causes of malnutrition was made by the pediatrist:

In 162 children, or 40 per cent—primary cause due to dietary factors.

In 67 children, or 15 per cent—primary cause due to enlarged tonsils and adenoids.

In 42 children, or 10 per cent—primary cause due to economic factors.

In 32 children, or 7 per cent—primary cause due to lack of coöperation with parents.

In 29 children, or 7 per cent—primary cause due to child's previous medical history.

In 98 children, or 21 per cent—primary cause due to miscellaneous factors, such as other medical causes, lack of discipline, and bad personal hygiene.—*Red Cross Service for Undernourished Children.* New York City, The Health Service, New York County Chapter, American Red Cross, 598 Madison Ave., New York City.

✦

Intestinal Intoxication in Infants.—The possibility of acute intestinal intoxication in infants being due to a chemical toxin rather than to infection has attracted the attention of a number of investigators. The author's studies were made to determine the nature of any toxic extracts of intestinal mucous membrane which might be responsible for the intoxication. In this study extracts of intestinal mucous membrane obtained under conditions minimizing as greatly as possible the danger of action from putrefactive organisms when used in the inoculation of rabbits, kittens, guinea pigs, and white mice. Similar inoculations were made with stool extracts and with blood injections. The author's conclusions are as follows:

1. Extracts of intestinal mucous membrane from cases of acute intestinal intoxication in children contain a toxic substance which, when injected into animals, produces a definite symptom complex, consisting of depression and narcosis, anorexia, circula-

tory failure, increase in the number of intestinal evacuations, and in some cases convulsions and death.

2. Younger animals were much more susceptible to this toxic substance than older ones.

3. The toxin is not destroyed by boiling and passes through a bacteria tight filter.

4. Crystals resembling those of the dipicrate of Bomino-azolylethyl-amine were obtained by appropriate means from the extracts of intestinal mucous membrane.

5. These crystals proved innocuous in animals until their basic character was restored by prolonged boiling with alcohol, when they became highly potent.

6. Previous dehydration of an animal rendered it more susceptible to the toxin.

7. Boiled aqueous extracts of fresh stools proved nontoxic when injected into animals.

8. Systemic blood from cases of acute intestinal intoxication was slightly toxic when injected into animals.

9. Portal blood from patients was very toxic.

10. No distinctive pathologic findings were seen in any of the fatal cases.—*Archives of Internal Medicine*, Feb. 15, 1923.

✤

Breast Feeding.—At least 95 per cent of mothers are able to nurse their babies. Breast feeding should not be advised—

1. When the mother is suffering from active pulmonary tuberculosis.

2. When the mother suffers from any disease which causes rapid progressive wasting.

3. When the mother again becomes pregnant.

In cases where breast milk is found by test feedings to be insufficient supplementary feedings of modified cow's milk must be given. Supplementary feedings, however, should fall just a little short of supplying the full caloric needs of the child. In these cases supplementary feedings should never be resorted to due to the tendency of infants to refuse to empty the breast, possibly because of the great ease with which the milk is obtained from the bottle.

In cases after the child has been weaned for as long a period as from one to seven weeks, it is possible to reëstablish lactation. This depends on various factors.

1. The mother must be willing and anxious to breast feed her baby.

2. Lactation must have been established in the first instance.

3. The longer the period of weaning the more difficult will be the reëstablishment. Jewesbury, *Archives of Pediatrics*, February, 1923.

✤

Infant Mortality Rate in England.—In an abstract of the Registrar General's Statistical Review for 1921, appearing in *The Medical Officer*, London, February 17, 1923, it is stated that the infant mortality was 83 per 1,000 births, the lowest rate yet recorded except in 1920, when it fell to 80. This rate of 83 is 25 per 1,000 lower than the average rate of the 5 pre-war years. It was, as is invariably the case, highest in the North (97), and lowest in the South (71). Among the London boroughs it ranged from 54 in Stoke Newington to 111 in Shoreditch; among the county boroughs the maximum rate was 135 in Stoke-on-Trent.

If a similar comparison is made with previous records, it shows that the average rate of infant mortality was 153 per 1,000 births in the perod 1841–50; 149 in that from 1871–80; 128 in 1901–10, and 100 for the decade which has just closed (1911–20). Had the deaths under one year been at the rate obtaining 75 years ago, they would have numbered 129,500 instead of 70,250—a saving of nearly 60,000 infant lives. Among the cases of infectious disease notified during the year, scarlet fever was most prominent with 137,073, and diphtheria third with 66,506 cases.

✤

Physiology of Exercise in Children.—Muscular exercise is one of the first instincts of the human organism. A clearer understanding of the physiology of this subject and the establishment and effective application of physiologic standards will lead to a higher degree of efficiency of our school children and will increase our knowledge of diagnosis in children from a functional point of view.

From a study of normal children of school age the authors arrive at the following conclusions regarding the relationship of posture to the pulse rate and systolic blood pressure in normal children of school age:

1. The pulse rate in a standing posture is invariably higher than in the lying posture, the ratio being 1.15.

2. The systolic blood pressure in the lying posture is invariably higher than in the standing posture; the ratio of the pressure in the lying posture to that in the standing being 1.11.

3. The ratio between the systolic blood pressure in the lying and the standing positions is about equal to the ratio between the pulse rate in the standing and lying positions.

With regard to the effect of exercise on the systolic blood pressure and on the pulse rate in normal children of school age, the authors arrive at a number of conclusions among which may be mentioned:

1. That all forms of exercise produce an increase in the pulse rate and the blood pressure, the increase depending mainly upon the type of exercise.

2. Neither the amount of exercise nor the speed determine the time of maximum reading.

3. In a majority of cases the increase of the pulse rate and the blood pressure as well as the reaction time of the blood pressure are in direct proportion to the speed and the amount of work performed.

4. Height and weight do not influence the maximum physical output.

5. The maximum physical output is in direct relationship to the age, circumference of chest, circumference of thigh and the vital capacity.

6. The reaction time of the pulse is too long to be of any clinical value, very few pulse rates return to normal within ten minutes.

7. In general, the reaction of the systolic blood pressure increases with increase in work. However, there are exceptions to this conclusion. Max Seham, M.D., and Grete Egerer-Seham, Ph.D., *Amer. Journal of Diseases of Children*, Vol. 25, No. 1, January, 1923.

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The Health of **Children** is a small pamphlet issued by the Department of Health of New Zealand for the purpose of establishing, as far as possible, consistency and uniformity in the principles that should guide educational and other authorities having to do with the rearing of children. It has special reference to the food and feeding of children beyond infancy, and attempts to correct prevailing dietary errors and set forth essential principles for improving the health, nutrition and growth of this portion of the population. The importance of fat in the diet of the child is emphasized, and it is pointed out that the cheaper "dripping" or suet may take the place of expensive butter where economic reasons make this desirable. The use of sugars and starches in their natural associations in ordinary foodstuffs is advised rather than in the separate, refined and concentrated forms of commerce. Likewise, highly refined cereals are not to be used to the exclusion of the whole grain foodstuffs. Excessive use of sweets is deplored, and the eating of these foods between meals is unequivocally condemned.

The greater use of fruit is strongly advocated, and special emphasis is placed upon its value as a means of minimizing oral sepsis. The protective value of fresh green vegetables is pointed out, and those used in the raw states are especially recommended. Attention is called to the fact that if the public is educated to the value of fruits and vegetables the increased demand for these foods would probably result in a fall in the cost to the consumer.

Tea and coffee are condemned in New Zealand, as elsewhere, but this country takes exception to the "milk cult" of America. Instead of McCollum's "quart of milk a day," the New Zealand child is supposed to need only a half-pint a day. Meat, in moderation, is permitted, but the use of canned foods is not encouraged.

After the age of two years, only three meals a day are recommended, and "soft, sloppy diet" is strongly condemned.

The dietary causes of dental disease are dwelt upon and oral hygiene is given much prominence. Indeed, it is evident that the "good teeth" propaganda has made marked progress in New Zealand, the statement being made that dental disease is "admittedly the most serious and urgent of all public health problems."

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Cost of Rural School Inspection.—In the section on Medical Inspection of Schools in the 26th *Annual Report* of the Provincial Board of Health, Province of British Columbia, for the year ending June 30, 1922, H. E. Young, the Provincial Officer of Health states that while some medical men have offered criticism and seem somewhat opposed to school medical inspection the majority of

them are appreciating more and more the benefits accruing to the children by such procedure and that the public are determined that the rising generation shall continue to receive such benefit. In the year 1920–21, 438 rural schools were inspected at a cost of $9,574.25, or 85 cents per pupil. In 1921-22, 506 schools were inspected at a cost of $11,364.80, or 84 cents per pupil. The percentage of defects observed in 1920–21 was 93.98 and in the year 1921–22, 94.01, an increase of 0.03 per cent.

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Course on Maternal and Infant Hygiene for Nurses.—In order to better understand and participate in the state-wide plans which have been initiated by the State Department of Public Health, and in which doctors, hospitals, and nursing organizations are participating, the Division of Hygiene has planned a study course on maternal and infant hygiene which was given in Boston January 8, 15, and 22, 1923.

The course will be repeated in various sections of the state after due notice, and is open to every public health nurse in the state. It comprises lectures on prenatal care, maternal care, and special factors in prenatal and maternal care. [To be most completely effective the work of the public health nurse in infant and maternal hygiene must be coördinated with other public health activities which stand in such important relationship to these problems. For this reason, the courses planned and undertaken by the Division of Child Hygiene of the Massachusetts State Department of Public Health are a distinct advance that might well be emulated by other states. Reviewer.]—*The Commonwealth*, Mass. State Department of Health, November–December, 1922.

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PUBLIC HEALTH LEGISLATION

JAMES A. TOBEY, LL.B.

NOTE.—The following material is taken from the Bi-Weekly Statements on National Health Legislation of the National Health Council.

PROGRESS ON LEGISLATION PREVIOUSLY CONSIDERED

S. Doc. 302. **Reorganization of Government Departments.** The plan for reorganization of the federal executive departments was submitted to Congress by the President on February 15th, though no bill was introduced and no action taken. The principal matter of interest to sanitarians is, of course, the proposed new Department of Education and Welfare.

Existing bureaus which would be transferred to this Department of Education and Welfare are as follows:

(a) From the Department of the Interior:
- Bureau of Education
- Indian Schools
- Howard University
- St. Elizabeths Hospital
- Freedmen's Hospital
- Bureau of Pensions

(b) From the Department of Labor:
- Women's Bureau
- Children's Bureau

(c) From the Treasury Department:
- U. S. Public Health Service

(d) From the War Department:
- Soldiers' Home

(e) From the Department of Justice:
- Office of Superintendent of Prisons

(f) Independent Establishments:
- Smithsonian Institution
- Federal Board of Vocational Education
- National Home of Disabled Volunteer Soldiers
- Columbia Institution for the Deaf
- Veterans Bureau

The department would have four divisions, namely: Health, Education, Social Service, and Veteran Relief, each under an assistant secretary.

Other recommendations of general interest include the combining of the War and Navy Departments into a new Department of National Defense; transfer of public works activities from War and Navy to other departments, chiefly the Interior; change of name of Post Office Department to Department of Communication; and removal of non-fiscal services from the Treasury Department.

H. R. 8928. **Reclassification of Government Positions.** Signed by President, March 3, 1923. This measure as finally passed is a compromise between ideas of Senator Smoot and Senator Sterling. It was originally passed about fourteen months ago by the House, which has also concurred in the recent Senate changes.

The bill as passed does not apply to the Public Health Service. Six groups are provided for, with grades in each and ranges of annual salaries as follows:

(a) Professional and Scientific Service:
- Grade 1, junior, $1860-2400
- Grade 2, assistant, $2400-3000
- Grade 3, associate, $3000-3600
- Grade 4, Professional, $3800-5000
- Grade 5, senior, $5200-6000
- Grade 6, chief, $6000-7500
- Grade 7, special, $7500

(b) Subprofessional:
- Grade 1, minor, $900-1260
- Grade 2, under, $1140-1500
- Grade 3, junior, $1320-1680
- Grade 4, assistant, $1500-1860
- Grade 5, main, $1680-2040
- Grade 6, senior, $1860-2400
- Grade 7, principal, $2100-2700
- Grade 8, chief, $2400-3000

(c) Clerical, Administrative and Fiscal Service

(d) Custodian Service

(e) Skilled Trades Service

(f) Common and Specialized Labor Service

No definite mention is made of the professions embraced under each group. This will be determined by a board consisting of the Director of the Bureau of the Budget, a member of the Civil Service Commission, and the Chief of the Bureau of Efficiency, to be known as the Personnel Classification Board. Heads of departments will allocate their subordinates in the groupings in accordance with rules laid down by the board. Nurses were placed in the professional group in the former bill, but it will remain for the board to determine where they shall be under this present law. The law goes into operation on July 1, 1924.

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H. R. 8086. **Prohibition of Filled Milk in Interstate Commerce.** Signed by President, March 3, 1923. The so-called filled milk bill passed the Senate in the closing days of the session, having come up after the doom of the ship subsidy was apparent. This measure, which passed the House last May, prohibits in interstate commerce the shipment of filled milk and describes it as an adulterated article of food injurious to public health, the sale of which constitutes a fraud upon the public. It further defines filled milk as any milk, cream, or skimmed milk, whether or not condensed, evaporated, concentrated, powdered, dried or desiccated to which has been added or blended any fat or oil other than milk fat. A number of bills prohibiting manufacture and sale of such products in the states are before several state legislatures.

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H. J. Res. 453. **Narcotics.** Signed by President, March 2, 1923. This resolution, which supplanted H. J. Res. 430 and H. J. Res. 451, requests the President to urge upon the governments of India, Persia and Turkey, Peru and Bolivia and the Netherlands possession of Java to limit the production of habit-forming drugs so as to meet only the supply necessary for medicinal and scientific purposes. Hearings on this resolution were held before the House Committee on Foreign Affairs on February 13, 14, 15 and 16, 1923. Copies of the hearings are available.

The testimony, according to the report of the Committee to the House, revealed that the total number of addicts in this country at the present time probably exceeds 1,000,000. The range of addicts is reported as between the ages of 12 and 75 years. The majority of addicts, the report continues, are using morphine or opium or its preparations; most of the heroin addicts are comparatively young, a portion of them being boys and girls under the age of 20 years, and this is also true of the cocaine addicts. The President is asked to report to Congress at its next session the result of his negotiations with the foreign countries in the restriction and limitation of the production of these drugs.

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S. 4584. **Prohibition of the Drug Heroin in Interstate Commerce.** Introduced by Senator Ladd, February 17, 1923. Referred to the Committee on Interstate Commerce. This bill would prohibit the transportation in

interstate commerce of the drug heroin. The penalty for violation would be fine of not less than $1,000 and a year's imprisonment. No action was taken on this bill.

H. R. 14222. **Compensation for Injured Government Employees.** Passed House, March 1, 1923. Passed Senate. The principal changes made in the act by this amendment include the provisions that persons suffering injuries whose case has been reviewed and decided by the commission shall not lose compensation through an appeal to any other administrative officer, employee or agent of the Government, who may reverse the commission's decision except for fraud or error in mathematical calculation.

H. R. 14401. **Amendments to War Risk Insurance Acts.** Signed by President, March 3, 1923. This bill provides, among other things, that a person suffering from neuropsychiatric or tubercular disease developed within three years after separation from the service shall be considered to have incurred it while in the service and so entitled to compensation, provided medical examination shows a ten per cent or greater disability. Another section provides for transportation for veterans who are receiving hospitalization.

H. R. 10003. **Amendment to War Risk Insurance Act.** Signed by President, March 2, 1923. This amendment prescribes changes in the law governing payment and handling of both insurance and compensation of disabled veterans becoming mentally incompetent. It also provides for the care and treatment of such men.

H. R. 13691. **Sale of Marine Hospital Reservation at Detroit.** This measure came up for passage in the House on March 1 and was defeated on account of an objection made by Representative Blanton of Texas. It provided for the sale of the present Marine Hospital Reservation at Detroit, the proceeds to be used in the purchase of a new site and the erection of a new hospital structure.

H. R. 12751. **Transfer of Hospital Reservation at Fort Logan H. Roots in Arkansas.** Signed by President, March 2, 1923. This proposed act provides for the transfer by the Director of the U. S. Veterans Bureau of a portion of the hospital reservation of the U. S. Veterans Bureau known as Hospital No. 78 at Fort Logan H. Roots in the State of Arkansas to the Big Rock Stone and Construction Company. A price of $150 an acre is stipulated in the bill, which went through the House without a record vote.

H. R. 14431. **Additional Hospital Facilities for Disabled Veterans.** Introduced by Representative Langley of Kentucky, February 26, 1923. Referred to the House Committee on Public Buildings and Grounds. An appropriation of $5,000,000 would be made immediately available, by the terms of this measure, for the construction of additional hospital and out-patient dispensary facilities for disabled war veterans. The Director of the U. S. Veterans Bureau subject to the approval of the President would have the authority for the expenditure of the money appropriated.

S. 3721. **Additional Buildings for National Leper Home.** Passed House, February 13, 1923. Enlargement of the accommodations of the Government leprosarium at Carville, Louisiana, was authorized in this measure, 300 beds would have been added to the institution, bringing the total up to 500 beds. During debate on the bill, it was pointed out that state health authorities all over the country had been filing applications to have lepers taken care of in the home, but because of limited facilities the U. S. Public Health Service had been compelled to reject them. The ultimate reduction of the number of lepers to a minimum in the United States was predicted through governmental care and treatment. The proposed improvement would have been effected by an appropriation of $650,000.

S. J. Res. 285. **Child Labor.** Reported February 24, 1923. The resolution for an amendment to the Federal Constitution giving Congress the right to control child labor was reported, but no further action was taken.

H. R. 13272. **Authorizes Drain at Miami Beach.** Signed by President, March 2, 1923. This measure authorizes the city of Miami Beach, Florida, to maintain and construct a drain for sewage across the lands of the United States in the vicinity of the city.

S. 3544; H. R. 11490. **Transfer of Activities of Interdepartmental Social Hygiene Board to the Department of Justice.** The Senate bill came up on February 12 and was passed over an objection by Senator Stanley. In the House, the bill came up for consideration on March 1, but was sidetracked when Mr. Moores objected. It was, therefore, not acted upon before Congress adjourned.

REVIEW OF HEALTH LEGISLATION IN THE SIXTY-SEVENTH CONGRESS

For the first time in eight years Congress is taking an extended recess. The Sixty-Seventh Congress, having been in almost continuous session since April, 1921, adjourned on March 4, 1923. This Congress was the first in our history to have four sessions. They were as follows:

Sessions of Congress

First Session (special); April 11, 1921 to November 23, 1921, with a recess from August 24 to September 21, 1921.

Second Session (regular); December 5, 1921 to September 22, 1922, with a recess from June 30 to August 15, 1921.

Third Session (special); November 20, 1922 to December 4, 1922.

Fourth Session (regular); December 4, 1922 to March 4, 1923.

Number of Bills and Laws

During these four sessions of Congress over 21,000 bills and resolutions were introduced in both branches; 16,700 in the House and 5,419 in the Senate. In our Statements we have listed about 350 bills and resolutions as being of direct interest to sanitarians. In other words only 1.6 per cent of the measures before Congress have dealt with public health. 931 laws, of which 655 were public and 276 of private character, were placed on the statute books during the Sixty-seventh Congress. Only 13 of these, or 3.3 per cent, have a direct bearing on public health. The health bills which passed include the following public laws:

Health Laws Passed

No. 47. *Veterans Bureau* created. August 9, 1921. (H. R. 6611.)

No. 51. *Packers Act*. Regulating interstate and foreign commerce in live stock and dairy products. (H. R. 6320.)

No. 74. *Cincinnati Health Exposition*, cancellation stamp for. October 10, 1921. (H. R. 8365.)

No. 78. *Veterans in Hospitals*, tobacco for. October 14, 1921. (S. 1718.)

No. 96. *Anti-Beer* act, supplement to national prohibition law. November 23, 1921. (H. R. 7294.)

No. 97. *Maternity and Infancy*, promotion of welfare (Sheppard-Towner law). November 23, 1921. (S. 1039.)

No. 110. *Scarcy hospital* for colored insane in Alabama, land for. (H. R. 6961), November 5, 1921.

No. 125. *Water supply* for Fortress Monroe. (H. R. 7204.)

No. 129. *Medical and surgical supplies* transferred by Army to Russian relief. (S. 2708), January 19, 1922.

No. 194, No. 216, and No. 273. *Hospitals* for veterans. (H. R. 10864, H. R. 11547, H. R. 11588, resp.), April 14, 1922; May, 1922; July 1, 1922.

No. 227. *Narcotics* prohibited from importation or exportation except for medicinal purposes. (H. R. 2193), May 26, 1922.

No. 225. *Pay* of Army, Navy, Public Health Service, etc. (H. R. 10972), June 7, 1922.

No. 318. *Tariff* act. (H. R. 7456), September 21, 1922.

No. 330. *Leprosy* station in Hawaii. (H. R. 11589), June 19, 1922.

No. 347. *Coal* commission. (H. R. 12377.)

No. 352. *Fees*, surgeons of Pension Bureau. (S. 3540), September 22, 1922.

No. 430. *Federal Leprosarium*, additional buildings for. February, 1923. (S. 3721.)

No. 460. *War Risk Insurance*, amendment concerning. March 2, 1923. (H. R. 10003.)

No. 463. *Hospital* in Arkansas, transfer. March 2, 1923. (H. R. 12751.)

No. 472. *Sewage* drain at Miami, Florida. March 2, 1923. (H. R. 13272.)

No. 513. *Filled Milk*, prohibition of in interstate commerce. March 3, 1923. (H. R. 8086.)

No. 516. *Reclassification* of Government positions and salaries. March 3, 1923. (H. R. 8928.)

No. 542. *War Risk Insurance*, amendment concerning. March 3, 1923. (H. R. 14401.)

No. 519. *Butter*, standard for. March 3, 1923. (H. R. 12052.)

No. 536. *Compensation* for injured Government employees. March 3, 1923. (H. R. 14222.)

and the following public resolutions:

No. 63. Disposal of articles produced by patients of *Veterans Bureau*. (H. J. Res. 313.)

No. 65. *Pollution of Navigable Waters* convention. (H. J. Res. 297), August, 1922.

No. 75. *Water supply* of Kansas City, Missouri and Kansas. (S. J. Res. 216.)

No. 96. *Narcotic control*, international cooperation in. March 2, 1923. (H. J. Res. 453.)

In looking over these 31 laws, it will be noted that a dozen or so are of considerable

importance to national health. These include the acts for creating the veterans Bureau and the hospitalization of veterans, the maternity and infancy law, the anti-beer measure, the laws relating to narcotics, increase of pay for the Public Health Service, reclassification of government salaries, the Tariff, the act increasing facilities at the Federal leprosarium, and the filled milk law. There is, of course, some difference of opinion regarding a few of these laws, such as the maternity act and the filled milk law, but these dozen measures mentioned are the ones which will influence public health.

Health Bills Not Passed

Since only 31 health bills became laws, about 320 failed of passage. Many of these were minor measures and some of them "freak" ones, and a large number never got out of committee. Among the more important health bills which did not pass may be mentioned: the resolution to amend the Constitution relative to restriction of child labor; transfer of activities of the Interdepartmental Social Hygiene Board to the Department of Justice; the Fess-Capper bill for Federal aid to physical education; commissions for sanitary engineers in the U. S. Public Health Service; reorganization of the U. S. Public Health Service; the uniform marriage and divorce bill; sale of Marine Hospital at Detroit; a number of bills relating to tuberculosis; and a couple of anti-vivisection measures. The District of Columbia, for which Congress legislates, fared particularly badly with respect to health measures. Bills to regulate milk, venereal diseases, optometry, and child welfare were not acted upon.

MATTERS OF GENERAL INTEREST IN CONGRESS

It may be worth while to include a brief review of some of the general accomplishments of the Sixty-seventh Congress. As is usual, the Republicans laud them, while the Democrats assert that the actions of this Congress have been a dismal failure. Some of the outstanding legislation, however, includes: the tax revision; the adoption of the budget system; the tariff law; various laws assisting agriculture; federal road aid; restriction of immigration; increase of federal judges; railroad mileage books; British debt funding; federal coal commission; and the naval scrapping act.

Among important measures which did not pass were the ship subsidy, anti-lynching bill, loan for Liberia, Muscle Schoals project, the measures changing dates of inauguration of the President and taking office of new Congress members, and the department of education bill. The President vetoed the soldier bonus bill and also a pension measure.

STATE HEALTH NOTES

California

A new branch health office has just been opened by the Los Angeles County Health Department to serve the cities of Alhambra, San Gabriel and El Monte. Dr. A. S. Baker, formerly connected with the health department of Seattle, and a graduate of the University of Denver, has been appointed health officer for this district.

Florida

Less than two years ago Tampa bowed to the inevitable forced upon her by becoming a real city, and established a health department. Since that time much has been accomplished. In this city of 60,000 inhabitants there were 8000 open privies for which have been substituted a sanitary system of sewers. A coöperative movement by various city departments has been established to encourage sewer and water extensions.

Illinois

A field physician from the State Department of Public Health has recently completed a careful survey of the eleven county tuberculosis sanatoria now in operation in Illinois and the findings show a maximum capacity of 400 beds. The average number of patients cared for in the eleven institutions is 331 while the average cost of maintenance per month for all the sanatoria is $25,300 or slightly more than $76 per month per patient. The survey showed further that four of the sanatoria hold diagnostic clinics, all but three conduct dispensary service and all but four carry

on, in some measure at least, county tuberculosis and public health work. The lowest appropriation for any of the sanatoria for 1923 is $10,000 but the total amount available in that instance is nearly $30,000, a contract with the United States government with reference to tuberculous ex-service men making up the difference. All the other ten sanatoria, with the exception of one $18,000 budget, have appropriations for 1923 ranging from $25,000 to $40,800 for maintenance and in two cases extra appropriations for building.

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Under a cooperative arrangement between the State Departments of Public Health and Welfare a campaign is on foot for applying the Schick test to inmates of state institutions. The work will be carried out under the direction of the health department which will also furnish toxin-antitoxin for the immunization of all positive reactors. The boys' school at St. Charles carried out the plan some time ago and all newcomers are now tested upon arrival and immunized when nonimmune to diphtheria. During the week of March 11–17, the 2,000 inmates of the Lincoln State School and Colony were Schick tested and follow-up work will proceed immediately. Other state institutions where danger from diphtheria exists will be treated in like manner.

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A general survey of the character of down-state municipal milk supplies, with especial reference to safety, has been practically completed by the State Department of Public Health. The results show that fifteen municipalities now have in force ordinances that satisfactorily meet the requirements which are considered by the department as essential to a safe milk supply. None of the fifteen have recently adopted the model milk ordinance recommended by the department. Spring elections have retarded, somewhat, the progress of the field staff in carrying out its safe milk campaign program.

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Maryland

Dr. W. T. Pratt of Rockville, County Health Officer for Montgomery County, has been appointed Deputy State Health Officer for the Fifth Sanitary District of Maryland, comprising Prince George's and Montgomery counties. Dr. Pratt has given up private practice and is serving on a full-time basis. This makes the second full-time appointment among the county health officers, the first being Dr. C. C. McCulloch, Jr., full-time Health Officer for Allegany County with headquarters at Cumberland. Col. McCulloch is also Deputy State Health Officer for the First Sanitary District, comprising Allegany and Garrett counties. Colonel McCulloch—he is better known among sanitarians in this country and abroad by his army title—was associated with General Gorgas during the building of the Panama Canal, and for two years held the post of Executive Officer on the Isthmus. He also served as professor of Military Hygiene in the Army Medical School in Washington, and when Librarian of the Surgeon General's Library established the extension service which makes it possible for a physician in any part of the country to have direct use of the facilities of the library.

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New Jersey

The State Department of Health appointed Charles J. Merrell as Assistant Director of Health, to succeed the late R. B. Fitz-Randolph. Mr. Merrell is Chief of the Bureau of Administration. The Laboratory of Hygiene, of which the late R. B. Fitz-Randolph was the director, has been divided into two bureaus. John V. Mulcahy was appointed Chief of the Bureau of Bacteriology and John E. Bacon, Chief of the Bureau of Chemistry.

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Dr. A. Clark Hunt retired from the State Department after thirty-seven years' service. He served successively as an assistant secretary of the board in charge of communicable diseases, Chief of Bureau of Medical Supervision, and editor of the *Public Health News*.

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At the thirteenth Annual Conference of State and Local Health Officials, held March 1 and 2, C. K. Blanchard, an assistant epidemiologist of the State Department of Health, told of an investigation of a recent typhoid outbreak at Franklin, New Jersey. He found that the epidemic, which included 114 cases with 18 deaths, was caused by the leakage of infected water from an industrial main into the otherwise adequately protected public water supply.

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A typhoid carrier was fined $100 and costs for working in a dairy and thereby causing an epidemic, after he had been informed that he was a carrier; that he already had caused one epidemic; and that he was prohibited from engaging in the handling of food. Although

he used an assumed name in seeking employment in the second dairy, he was recognized by an assistant epidemiologist of the State Department of Health, and quarantined temporarily by the Newark Department of Health until legal action was taken against him.

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New Mexico

Mr. H. F. Gray, who has been the sanitary engineer for the New Mexico State Health Department since its organization, has resigned and gone east to enter business. Mr. Gray has been the principal factor in bringing many of the water supplies and sewerage systems of the state up to a higher standard than had been reached before.

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CONVENTIONS, CONFERENCES AND MEETINGS

This calendar is published through the cooperation of the National Health Council, 370 Seventh Avenue, New York City. The Council will be glad to answer promptly any written or telegraphic inquiries regarding meeting dates in order to avoid conflicts.

April 30, American Gastro-Enterological Association, Atlantic City, N. J.

May 1-3, Association of American Physicians, Atlantic City, N. J.

May 7-9, American Association of Engineers, Norfolk, Va.

May 10, Association of New England Food and Drugs Officials, Portsmouth, N. H.

May 10-12, American Laryngological, Rhinological and Otological Society, Atlantic City, N. J.

May 16-17, American Laryngological Association, Atlantic City, N. J.

May 16-23, National Conference of Social Workers, Washington, D. C.

May 21-23, American Gynecological Society, Hot Springs, Va.

May 21-23. American Urological Association, Rochester, Minn.

May 21-25, American Water Works Association, Detroit, Mich.

May 23-24, American Climatological and Clinical Association, Niagara Falls, Ontario.

May 28-31, American Society of Mechanical Engineers, Montreal, Canada.

June 1-2, American Neurological Association, Boston, Mass.

May 31-June 2, American Pediatric Society, French Lick, Ind.

June 7-9, American Orthopedic Association, Rochester, N. Y.

June 7-9, American Dermatological Association, Ann Arbor, Mich.

June 9, Eugenics Research Association, Cold Spring Harbor, N. Y.

June 12-14, Canadian Public Health Association and Canadian Association for Prevention of Tuberculosis, Edmonton, Alb.

June 15-18, American Association for the Study of the Feeble Minded, Detroit, Mich.

June 19-22, American Psychiatric Association, Detroit, Mich.

June 20-23, National Tuberculosis Association, Santa Barbara, Cal.

June 21, National League of Nursing Education, Boston, Mass.

June 22-23, Radiological Society of North America, San Francisco, Cal.

June 25-26, Association of Medical Milk Commissioners, San Francisco, Cal.

June 25-29, American Medical Association, San Francisco, Cal.

June 26-28, American Association for Anesthetists, San Francisco, Cal.

June 26-28, Annual State Conference of Health Officers and Public Health Nurses, Saratoga Springs, N. Y.

July 1-7, National Education Association, San Francisco, Cal.

July 10, Public Health Council. Place undecided.

August 28-31, National Medical Association, St. Louis, Mo.

September 4-14, National Woman's Christian Temperance Union, Columbus, Ohio.

September 10-14, American Dental Association, Cleveland, Ohio.

September —, American Electro-Therapeutic Association, Providence, R. I.

September —, American Roentgen Ray Society, Chicago, Ill.

September 19-21, American Association of Obstetricians, Gynecologists, and Abdominal Surgeons, Philadelphia, Pa.

September 24-27. Annual Convention American Red Cross, Memorial Congress Hall of Daughters of the American Revolution, Washington, D. C.

October 8-11, American Public Health Association, Boston, Mass.